PB86-144656

Stability of Parts-per-Billion Hazardous Organic Cylinder Gases and Performance Audit Results of Source Test and Ambient Air Measurement Systems. Status Report 2

Research Triangle Inst.
Research Triangle Park, NC

Prepared for

Environmental Monitoring Systems Lab.
Research Triangle Park, NC

Dec 85

U.S. Department of Commerce
National Technical Information Service
NTIS

PB86-144656

EPA/600/2-86/003
December 1985

STABILITY OF PARTS-PER-BILLION HAZARDOUS ORGANIC CYLINDER GASES AND PERFORMANCE AUDIT RESULTS OF SOURCE TEST AND AMBIENT AIR MEASUREMENT SYSTEMS

STATUS REPORT #2

by

R. K. M. Jayanty
S. W. Cooper
J. A. Sokash
C. E. Decker
Center for Environmental Measurements
Research Triangle Institute
Research Triangle Park, North Carolina 27709

EPA Contract No.: 68-02-3767

D. J. von Lehmden
Quality Assurance Division
Environmental Monitoring Systems Laboratory
Research Triangle Park, North Carolina 27711

Environmental Monitoring Systems Laboratory
Office of Research and Development
U.S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

NOTICE

This document has been reviewed in accordance with U.S. Environmental Protection Agency policy and approved for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA/600/2-86/003	**2.**	**3. RECIPIENT'S ACCESSION NO.** PB86 144656/AS
4. TITLE AND SUBTITLE STABILITY OF PARTS-PER-BILLION HAZARDOUS ORGANIC CYLINDER GASES AND PERFORMANCE AUDIT RESULTS OF SOURCE TEST AND AMBIENT AIR MEASUREMENT SYSTEMS--STATUS REPORT #2		**5. REPORT DATE** December 1985 **6. PERFORMING ORGANIZATION CODE**
7. AUTHOR(S) R. K. M. Jayanty, S. W. Cooper, J. A. Sokash and C. E. Decker		**8. PERFORMING ORGANIZATION REPORT NO.**
9. PERFORMING ORGANIZATION NAME AND ADDRESS Research Triangle Institute Research Triangle Park, NC 27709		**10. PROGRAM ELEMENT NO.** DU-D109, Project I1401 **11. CONTRACT/GRANT NO.** Contract 68-02-3767
12. SPONSORING AGENCY NAME AND ADDRESS U. S. Environmental Protection Agency Environmental Monitoring Systems Laboratory Research Triangle Park, North Carolina 27711		**13. TYPE OF REPORT AND PERIOD COVERED** **14. SPONSORING AGENCY CODE** EPA/600/08

15. SUPPLEMENTARY NOTES

16. ABSTRACT

A repository of 22 gaseous organic compounds at parts-per-billion (ppb) levels in compressed gas cylinders has been established by the U.S. Environmental Protection Agency (EPA). The primary objectives of this ongoing project are: 1) to provide accurate gas mixtures to EPA, state/local agencies, or their contractors for performance audits to assess the relative accuracy of source measurement systems during hazardous waste trial burn tests and ambient air monitoring programs; 2) to verify the manufacturer's certified analysis of the multicomponent gas mixtures; 3) to determine the stability of gas mixtures with time; and 4) to develop new audit materials as requested by EPA.

The repository consists of 3 mixtures of 5, 8 and 9 organic compounds each. These mixtures were blended by a commercial gas supplier in aluminum cylinders in a balance gas of nitrogen. The 5-component mixture (Group I) contains carbon tetrachloride, chloroform, perchloroethylene, vinyl chloride and benzene. The 9-component mixture (Group II) includes trichloroethylene, 1,2-dichloroethane, 1,2-dibromoethane, acetonitrile, trichlorofluoromethane (F-11), dichlorodifluoromethane (F-12), bromomethane, methyl ethyl ketone and 1,1,1-trichloroethane. The 8-component mixture (Group III) includes pyridine, vinylidene chloride, 1,1,2-trichloro 1,2,2-trifluoroethane (F-113), 1,2-dichloro 1,1,2,2-tetrafluoroethane (F-114), acetone, 1,4-dioxane, toluene, and chlorobenzene. To date 41 performance audits have been initiated and 35 are complete. The results of these audits and description of the experimental procedures used for analyses and available stability data are presented in this Status Report 2.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Hazardous pollutants, gas stability, organic gases, source measurements, ambient air monitoring, performance audits, ppb gases		

18. DISTRIBUTION STATEMENT RELEASE TO PUBLIC	**19. SECURITY CLASS** *(This Report)* UNCLASSIFIED	**21. NO. OF PAGES**
	20. SECURITY CLASS *(This page)* UNCLASSIFIED	**22. PRICE**

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

FOREWORD

Source measurement and monitoring efforts are designed to anticipate potential environmental problems, to support regulatory actions by developing data bases needed in developing regulations and to provide means of monitoring compliance with regulations. The Environmental Monitoring Systems Laboratory, Research Triangle Park, North Carolina, has the responsibility for implementation of agency-wide Quality Assurance programs for air pollution measurement systems; and supplying technical support to other groups in the Agency including the Office of Air and Radiation, the Office of Toxic Substances, and the Office of Enforcement.

The need for reliable standards for auditing and documenting the accuracy of source emission measurement of organic hazardous pollutants is well established. The Quality Assurance Division of EPA's Environmental Monitoring Systems Laboratory has responded to this need through the development of an extensive repository of gaseous organic compounds in parts-per-billion (ppb) levels in compressed gas cylinders. The primary objectives of this on-going project are (1) to provide accurate gas mixtures to EPA, state/local agencies, or their contractors for performance audits to assess the accuracy of source measurement systems during hazardous waste trial burn tests and ambient air monitoring programs; (2) to verify the manufacturer's certified analysis of the multi-component gas mixtures, (3) to determine the stability of the gas mixtures with time, and (4) to develop new audit materials as requested by EPA. This report describes the current status of this project. Included in the report are (1) a description of the experimental procedures used for the analyses of multi-component ppb level gas mixtures; (2) a description of the audit procedure, and (3) currently available audit results and stability data.

Thomas R. Hauser, Ph.D.
Director
Environmental Monitoring Systems Laboratory
Research Triangle Park, North Carolina

ABSTRACT

A repository of 22 gaseous organic compounds at parts-per-billion (ppb) levels in compressed gas cylinders has been established under a contract with the Environmental Protection Agency (EPA). The primary objectives of this on-going project are: (1) to provide accurate gas mixtures to EPA, state/local agencies, or their contractors for performance audits to assess the relative accuracy of source measurement systems during hazardous waste trial burn tests and ambient air monitoring programs; (2) to verify the manufacturer's certified analysis of the multi-component gas mixtures; (3) to determine the stability of the gas mixtures with time; and (4) to develop new audit materials as requested by EPA.

The repository consists of three mixtures of five, eight and nine organic compounds each. These mixtures were blended by a commercial gas supplier in aluminum cylinders in a balance gas of nitrogen. The five component mixture (Group I) contains carbon tetrachloride, chloroform, perchloroethylene, vinyl chloride and benzene. The nine component mixture (Group II) includes trichloroethylene, 1,2-dichloroethane, 1,2-dibromoethane, acetonitrile, trichlorofluoromethane (F-11), dichlorodifluoromethane (F-12), bromomethane, methyl ethyl ketone and 1,1,1- trichloroethane. The eight component mixture (Group III) includes pyridine, vinylidene chloride, 1,1,2-trichloro 1,2,2-trifluoroethane (F-113), 1,2- dichloro 1,1,2,2-tetrafluoroethane (F-114), acetone, 1,4-dioxane, toluene, and chlorobenzene. To date 41 performance audits have been initiated and 35 are complete. The results of these audits and a description of the experimental procedures used for analyses and available stability data are presented in this status report. Generally, the results of the audits show reasonable agreement (plus or minus 50 percent) with the audit material concentrations measured by Research Triangle Institute, considering the low concentrations of the organics and the anticipated uncertainty associated with independent analyses conducted by an audit laboratory.

Stability studies for all Group I and Group II compounds have been performed. Results indicate that all the compounds tested are adequately stable for use as reliable audit materials. The Group III compounds will not be available for audits until stability of the compounds has been established. If the data indicate that the Group III compounds are stable, Group III mixtures should be available for audits on or after December 1, 1985.

CONTENTS

FOREWORD iii
ABSTRACT iv
FIGURES vi
TABLES vii
1. INTRODUCTION 1
    OBJECTIVES 1
    AUDIT MATERIALS CONTAINED IN THE REPOSITORY 1
2. EXPERIMENTAL PROCEDURES 3
    INSTRUMENTATION 3
    CALIBRATION 3
    SAMPLE ANALYSIS PROCEDURE 7
    QUALITY CONTROL PROCEDURES 8
3. PERFORMANCE AUDITS 9
4. STABILITY STUDIES 30
5. SUMMARY AND CONCLUSIONS 32
APPENDIX A STABILITY STUDY FOR GROUP I COMPOUNDS
STABILITY STUDY FOR GROUP II COMPOUNDS A-1
APPENDIX B AUDIT INSTRUCTIONS B-1
APPENDIX C PERMEATION RATE DATA C-1

FIGURES

Number Page

1 Schematic of the Gas Chromatographic System 4

2 Schematic of the Permeation System 5

TABLES

Number Page

1 PPB Level Organic Gases in Repository 2

2 GC Conditions for Analysis of PPB-Level Repository Gases 6

3 Summary of Sampling and Analysis Methods Used During Performance Audits 10

4 Summary of Performance Audit Results 16

SECTION 1
INTRODUCTION

OBJECTIVES

The application of Quality Assurance practices is important to the generation of high-quality environmental data. The Quality Assurance Division of EPA's Environmental Monitoring Systems Laboratory has initiated a program to supply audit materials for use during hazardous waste trial burn tests and ambient air measurements. The Research Triangle Institute (RTI), under contract to the U.S. Environmental Protection Agency (USEPA), has responded to this need through development of a repository of 22 gaseous organic compounds at parts-per-billion (ppb) levels in compressed gas cylinders. The main objectives of this project are: (1) to provide accurate gas mixtures to EPA, state/local agencies, or their contractors for performance audits to assess the relative accuracy of source measurement systems during hazardous waste trial burn tests and ambient air monitoring programs; (2) to verify the manufacturer's certified analysis of the multi-component gas mixtures; (3) to determine the stability of the gas mixtures with time; and (4) to develop new audit materials as requested by EPA.

This report describes the current status of the project. Included in the report are: (1) a description of the experimental procedures used for the analyses of multi-component ppb level gas mixtures; (2) a description of the audit procedure; and (3) currently available audit results and stability data.

AUDIT MATERIALS CONTAINED IN THE REPOSITORY

The repository currently contains 22 compounds selected on the basis of anticipated needs of EPA's Office of Solid Waste. Table 1 lists the 22 compounds, the concentration ranges, and the number of cylinders for each group in the repository. Group I cylinders each contain five (5) compounds. Group II cylinders each contain nine (9) compounds. Group III cylinders each contain eight (8) compounds. The audit cylinders generally fall into two concentration ranges with one exception. Each compound in the low concentration range is between 7 and 90 parts-per-billion (ppb) and in the high concentration range each compound is between 90 and 430 ppb. Twelve new audit cylinders containing Group 1 compounds in the range of 430-10,000 ppb of each compound were recently added to the repository. The balance gas for all gas mixtures is nitrogen, and the cylinder construction material is aluminum.

Table 1. PPB Level Organic Gases in Repository

Group	No. of Cylinders	Concentration Range of Each Compound (ppb)
Group 1*	20	7-90
	12	90-430
	12****	430-10,000
Group 11**	12	7-90
	3	90-430
Group 111***	9****	7-90

*Group 1 Compounds: Carbon tetrachloride, chloroform, perchloroethylene, vinyl chloride and benzene.

**Group 11 Compounds: Trichloroethylene, 1,2-dichloroethane, 1,2-dibromoethane, acetonitrile, trichlorofluoromethane (F-11), dichlorodifluoromethane (F-12), bromomethane, methyl ethyl ketone, and 1,1,1-trichloroethane.

***Group 111 Compounds: Pyridine, Vinylidene Chloride, 1,1,2-trichloro 1,2,2-trifluoroethane (Freon-113), 1,2-dichloro 1,1,2,2-tetrafluoroethane (F-114), acetone, 1,4-dioxane, toluene, and chlorobenzene.

****These cylinders should be available for performance audits on or after December 1, 1985.

SECTION 2
EXPERIMENTAL PROCEDURES

Accurate analyses of the cylinder gases are required, (1) to verify the concentrations reported by the specialty gas company that prepared the gas mixtures, and (2) to assess the long-term stability of the concentrations of the compounds.

INSTRUMENTATION

Analyses of Group I and II mixtures are performed using a Hewlett-Packard 5880A gas chromatograph equipped with flame ionization and electron capture detectors. The electron capture detector (ECD) has been used principally for measurement of all the halogenated hydrocarbons except vinyl chloride. Vinyl chloride, benzene, methyl ethyl ketone and acetonitrile are analyzed with a flame ionization detector (FID). The gaseous samples are injected onto the columns by means of a high-speed six-port gas sampling valve (Seiscor valve Model AN 100A) mounted near the injection port. The valve is equipped with interchangeable sampling loops (1 cc and 10 cc) to allow the precise injection of known volumes of the gas mixtures. A schematic of the gas chromatographic system is shown in Figure 1.

The gas chromatographic parameters used in the measurement of individual compounds in Group I and Group II are listed in Table 2. The gas chromatographic parameters for the Group III compounds have not yet been established. The development of cryofocusing on capillary column for the analysis of Group III compounds is in progress and the details will be presented in a future report.

CALIBRATION

Calibration of the gas chromatograph involves measurement of known concentrations of organic gases in nitrogen. A custom-designed permeation system (Figure 2) which produces known concentrations of organics in nitrogen is used for calibration. Permeation tubes purchased from commercial suppliers are generally used as calibration standards for 14 organic compounds unless otherwise specified. Generally, two to five permeation tubes at a time are placed in a temperature-controlled chamber (30.0 ± 0.1°C) and pure

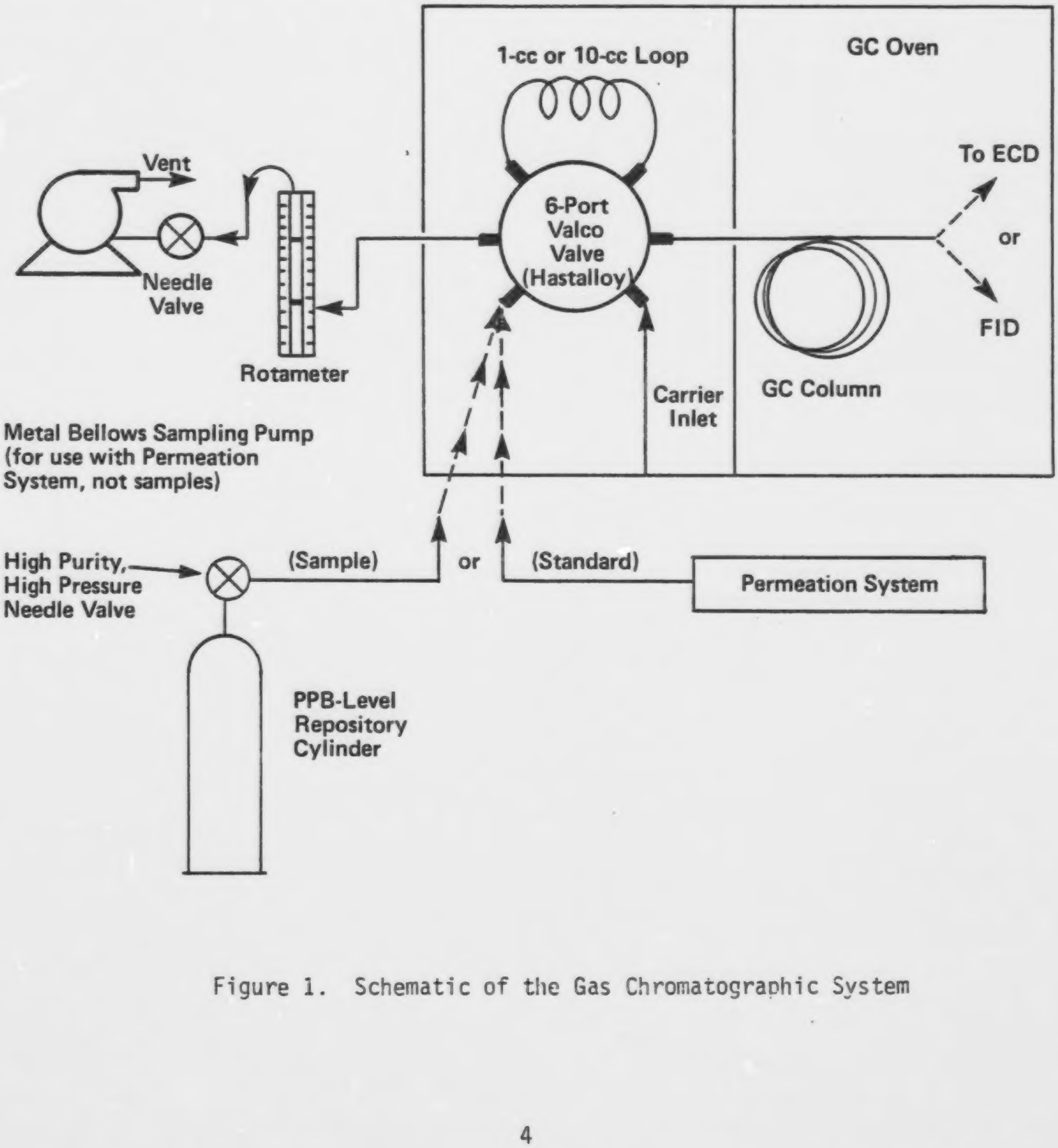
1-cc or 10-cc Loop
GC Oven
Vent
To ECD
6-Port
Valco
Valve
(Hastalloy)
or
Needle
Valve
FID
Rotameter
Carrier
Inlet
GC Column
Metal Bellows Sampling Pump
(for use with Permeation
System, not samples)
High Purity,
High Pressure
Needle Valve
(Sample)
or
(Standard)
Permeation System
PPB-Level
Repository
Cylinder

Figure 1. Schematic of the Gas Chromatographic System

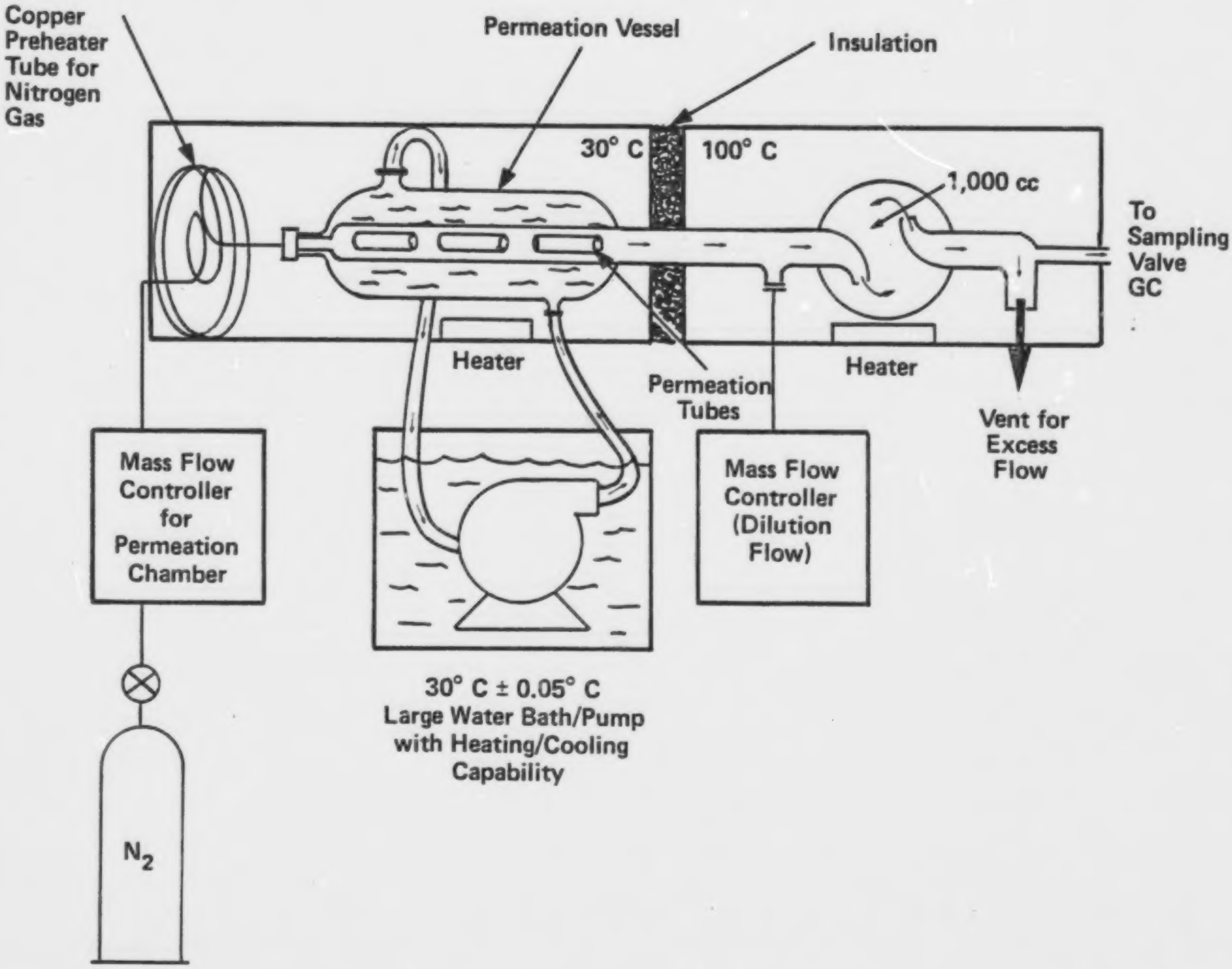
Copper Preheater Tube for Nitrogen Gas
Permeation Vessel
Insulation
30° C
100° C
1,000 cc
To Sampling Valve GC
Heater
Permeation Tubes
Heater
Vent for Excess Flow
Mass Flow Controller for Permeation Chamber
Mass Flow Controller (Dilution Flow)
30° C ± 0.05° C
Large Water Bath/Pump with Heating/Cooling Capability
N2

Figure 2. Schematic of the Permeation System

Table 2. GC Conditions for Analysis of PPB-Level Repository Gases

Compounds	Detector	Injector Temp.	Column Temp./ Carrier Gas	Column Type	Retention Time (min.)	Comments
			GROUP I			
Vinyl chloride Benzene	FID at 300°C 35 cc/min Hydrogen 500 cc/min Air or 500 cc/min 37% O_2 in Nitrogen	80°C	80°C, Isothermal/ Nitrogen at 55 cc/min	10 ft. x 1/8" stainless steel column packed with 20% SP 2100 w/0.1% Carbowax 1500, 100/120 mesh	0.7 3.5	10 cc sample loop used; 37% O_2 in N_2 as Detector oxidant added to increase sensitivity below 50 ppb
Chloroform Carbon tetrachloride Perchloroethylene	ECD at 330°C	110°C	100°C, Isothermal/ Argon w/5% Methane; at 40 cc/min	10 ft. x 1/8" stainless steel column packed with 20% SP 2100 w/0.1% Carbowax 1500, 100/120 mesh	1.6 2.1 3.9	1.0 cc sample loop used
			GROUP II			
Freon 12 Freon 11 Bromomethane Trichloroethylene 1,2-Dibromoethane	ECD at 330°C	110°C	80°C, Isothermal/ Argon w/5% Methane at 35 cc/min	10 ft. x 1/8" stainless steel column packed with 20% SP 2100 w/0.1% Carbowax 1500, 100/120 mesh	0.6 1.1 0.9 2.4 6.2	1 cc sample loop used
1,2-Dichloroethane 1,1,1-Trichloroethane	ECD at 330°C	110°C	110°C, Isothermal/ Argon w/5% Methane at 35 cc/min	20 ft. x 1/8" stainless steel column packed with 10% SP 1000, 80/100 Supelcoport	5.2 2.8	1 cc sample loop used
Acetonitrile and Methyl Ethyl Ketone	FID at 300°C 35 cc/min Hydrogen 500 cc/min Air or 500 cc/min 37% O_2 in Nitrogen	180°C	170°C, Isothermal/ Nitrogen at 35 cc/min	6 ft. x 1/8" stainless steel column packed with Porapak Q, 60/80 mesh	1.6 4.0	10 cc sample loop used; 37% O_2/N_2 used below 50 ppb; conditioned column 3 days

nitrogen is passed over the permeation tube at a known flow rate using Tylan mass flow controllers. The resultant gaseous mixture is further diluted, if necessary, by addition of nitrogen to the mixing chamber. The final gas mixture is removed from the permeation system (via a 3/16 inch SS line) by a metal bellows pump located downstream from the sampling loop. No interference was observed by keeping the number of tubes in parallel in the chamber at a time. Cross-contamination of the tubes does not occur as long as chamber flow of approximately 150 cc/min or more is maintained.

The permeation rate of each permeation tube is determined every 15 to 30 days by weight-loss determination of each tube. Permeation rates are checked both before and after analysis and the average of the last three values were used for rate determination. The permeation rate data obtained for each compound are included in Appendix C. Clean nylon gloves and tweezers are used to handle the permeation tubes. The permeation tubes are removed from the permeation chamber one at a time for weighing to avoid pick-up of moisture.

In order to avoid calibration errors associated with non-linear detectors (for example, ECD) at least two calibration standards are prepared each time a sample is analyzed. Both standards are prepared usually within 20 percent of the expected sample concentration. For analysis using FID, standard concentrations are matched to sample concentrations to within at least a factor of 2 and are within 20 percent at concentrations below 70 ppb. Two to six calibration standards are analyzed on each day of sample analysis. The calibration standards are injected both at the beginning and end of each day to check for instrumental drift.

SAMPLE ANALYSIS PROCEDURE

Figures 1 and 2 depict the entire analytical system used for the calibration and analysis of the gas mixtures. The analysis procedures used for the sample analysis are as follows: Initially the sample loops are purged with cylinder gas sample at approximately 27 cc/min for 2 minutes before injection. Whenever a 10 cc loop is used, it is purged with cylinder gas for an additional 2 minutes before injection onto the column. Sample gas flow is controlled by slowly opening the needle valve attached to the tank. After purging the loop, the gas flow is shut off at the needle valve. Four seconds after a flowmeter registers zero flow through sample loop, injection is made manually onto the column. The first injection of sample or standard is not considered quantitative, but instead is used to condition stainless steel lines and valves. Triplicate injections of the sample are made to determine the measurement precision. Generally, the measurement precision is within 3 percent.

QUALITY CONTROL PROCEDURES

Certain quality control procedures are followed, for example, equilibrating the permeation system before taking an aliquot for GC measurement. A set of primary standards for Group I and Group II multicomponent mixtures are analyzed each day cylinder gases are analyzed to verify the constancy of the detector response. The Group I and Group II primary standards were prepared and analyzed by the National Bureau of Standards (NBS) as part of an Interagency Agreement with EPA. NBS primary standards were not available for the RTI first and second analyses of Group II compounds shown in Appendix A (Stability Study). However, NBS primary standards were used for the third and all subsequent Group II stability analyses. RTI results for Group I and Group II NBS primary standards are included in Appendix A. Generally, RTI analysis results for the NBS primary standards are within 10 percent of the NBS analysis results. If results vary by more than 10 percent, a calibration error is assumed, and the permeation system and sample valves are checked for leaks under both positive and negative pressure. Leak detection fluid is used to check for leaks under positive pressure. Freon is used to check the leaks under negative pressure. This was done by monitoring the freon peak on the GC. Once all fittings are leak tight, recalibration of GC is performed. Blank measurements are taken during cylinder analysis and generally, blank measurements have shown no signal above the baseline.

SECTION 3
PERFORMANCE AUDITS

The RTI supplies repository cylinders for audits upon request from the EPA, state or local agencies or their contractors. A contractor must be performing hazardous waste trial burn tests or ambient air measurements at the request of EPA, a state or local agency in order to qualify for the performance audit. When a request is received, the tank pressures are measured and the cylinders are shipped by overland carrier. An aluminum suitcase containing a gas regulator, a heated glass manifold and the necessary tubing and fittings to draw the cylinder gas sample into the glass manifold is also provided for drawing the audit gas through the VOST system. A schematic of this audit gas delivery system is shown in Appendix B, Figure 1. A letter is included with the audit cylinder which gives general instructions for conducting the audit (see Appendix B). Detailed instructions are shown in Appendix B on how to conduct an audit of VOST (Instruction No. 3) and bag measurements (Instruction No. 1) during a hazardous waste trial burn. The audit gas concentration for each compound and cylinder gas pressure are provided to the requesting agency audit coordinator. There is no charge for the audit except the cost of returning the audit cylinder.

To date, 41 performance audits have been initiated; 36 are complete. The sampling and analysis methods used by auditees during performance audits are summarized in Table 3. The audit results currently available are presented in Table 4. The audit results are usually within ± 50 percent of the audit concentrations measured by RTI.

Table 3. Summary of Sampling and Analysis Methods Used During Performance Audits

Audit No.	Client*	Use of Audit Material	Method of Sampling and Analysis
1A	A	VOST method evaluation	Sampling by VOST method and analysis by GC/MS
1B	A	BAG method evaluation	Sampling by BAG and analysis by GC/FID-ECD
2A	B	VOST method evaluation	Sampling by VOST method and analysis by GC/MS
2B	B	BAG method evaluation	Sampling by BAG and analysis by GC/ECD-PID
3	C	VOST method evaluation	Sampling by VOST and analysis by GC/PID-Hall Detector
4	D	VOST method evaluation	Sampling by VOST and analysis by GC/MS
5	Region V U.S. EPA	Hazardous waste incineration trial burn	Sampling by VOST and analysis by GC/MS
6	Combustion Research Facility U.S. EPA	VOST method evaluation	Sampling by VOST and analysis by GC/MS
7	E	Hazardous waste monitoring instrument checkout**	Direct analysis by GC/ECD

(Continued)

Table 3. Summary of Sampling and Analysis Methods Used During Performance Audits (Continued)

Audit No.	Client*	Use of Audit Material	Method of Sampling and Analysis
8	F	VOST method evaluation	Sampling by VOST and analysis by GC/MS
9	Region III U.S. EPA	Hazardous waste monitoring instrument checkout**	Sampling method unknown, analysis by GC/FID
10	C	Ambient measurement method evaluation	Sampling method unknown, analysis by GC/FID
11	B	VOST method evaluation	Sampling by VOST and analysis by GC/MS
12	B	VOST method evaluation	Sampling by VOST and analysis by GC/MS
13	E	Hazardous waste monitoring instrument checkout**	Direct analysis by GC/ECD
14	E	Hazardous waste monitoring instrument checkout**	Direct analysis by GC/ECD
15	Region VI U.S. EPA	Ambient air monitoring instrument checkout**	Analysis by ambient hydrocarbon analyzer
16A	G	Hazardous waste monitoring method evaluation	Sampling by cryogenic preconcentrations, analysis by GC/FID

(Continued)

Table 3. Summary of Sampling and Analysis Methods Used During Performance Audits (Continued)

Audit No.	Client*	Use of Audit Material	Method of Sampling and Analysis
16B	G	Hazardous waste monitoring method evaluation	Sampling by cryogenic preconcentrations, analysis by GC/FID
17	H	Hazardous waste incineration trial burn	Sampling by VOST and analysis by GC/MS
18A	I	Ambient air monitoring instrument checkout**	Sampling by direct injection and analysis by GC/ECD
18B	I	Ambient air monitoring instrument checkout**	Method 1 sampling by Tedlar bag and Tenax-charcoal with analysis by GC/ECD; Method 2 sampling by Tenax-charcoal with analysis by GC/FID
18C	I	Ambient air monitoring instrument checkout**	Sampling by cryogenic preconcentration and analysis by GC/FID
19	B	Hazardous waste incineration trial burn	Sampling by VOST and analysis by GC/MS
20	J	Hazardous waste incineration trial burn	Direct analysis by MS/MS
21	K	Hazardous waste incineration trial burn	Sampling method unknown, analysis by GC/ECD or FID

(Continued)

Table 3. Summary of Sampling and Analysis Methods Used During Performance Audits (Continued)

Audit No.	Client*	Use of Audit Material	Method of Sampling and Analysis
22	L	Hazardous waste incineration instrument checkout**	Sampling by VOST and analysis by GC/MS
23	M	Ambient air monitoring instrument checkout**	Sampling method unknown, analysis by GC/FID/CD/PID/Hall detectors
24	G	Hazardous waste monitoring method evaluation	Sampling by cryogenic preconcentration and analysis by GC/FID
25	I	Ambient air monitoring instrument checkout**	Sampling and analysis method unknown
26	N	Hazardous waste incineration trial burn	Sampling by Glass bulb and analysis by GC/Hall Detector
27A	I	Ambient air monitoring instrument checkout**	Sampling by Tedlar bag and cryogenic preconcentration and analysis by GC/ECD
27B	I	Ambient air monitoring instrument checkout**	Sampling by Tedlar bag and analysis by direct injection and GC/ECD
27C	I	Ambient air monitoring instrument checkout**	Method 1 sampling by Tedlar bag and Tenax trap with analysis by GC/FID; Method 2 sampling by Tedlar bag and direct injection with analysis by GC/ECD

(Continued)

Table 3. Summary of Sampling and Analysis Methods Used During Performance Audits (Continued)

Audit No.	Client*	Use of Audit Material	Method of Sampling and Analysis
28	O	Hazardous waste incineration trial burn	Sampling by VOST and analysis by GC/MS
29	B	Hazardous waste incineration sampling method evaluation	Sampling by VOST and analysis by GC/MS
30A	P	Ambient air monitoring method evaluation	Sampling method unknown, analysis by GC/ECD
30B	P	Ambient air monitoring method evaluation	Sampling method unknown, analysis by GC/ECD
31	Q	Ambient air monitoring instrument checkout**	Sampling method unknown, analysis method unknown
32	B	Hazardous waste incineration sampling method evaluation	Sampling by VOST and analysis by GC/MS
33	B	Hazardous waste incineration sampling method evaluation	Sampling by VOST and analysis by GC/MS
34	R	Ambient air monitoring instrument checkout**	Sampling by Tenax-charcoal tubes, analysis method unknown.

(Continued)

Table 3. Summary of Sampling and Analysis Methods Used During Performance Audits (Continued)

Audit No.	Client*	Use of Audit Material	Method of Sampling and Analysis
35	C	Ambient air monitoring instrument checkout**	Sampling by Direct injection and cryotrap with analysis by MS
36	C	Ambient air monitoring instrument checkout**	Sampling by Direct injection and cryotrap with analysis by MS
37	S	Hazardous waste incineration VOST method evaluation	Sampling by VOST and analysis by GC
38	L	Ambient air monitoring instrument checkout**	Sampling method unknown, analysis by GC/MS
39	L	Ambient air monitoring instrument checkout**	Sampling method unknown, analysis by GC/MS
40	T	Hazardous waste monitoring for VOC	Sampling by Tenax loading and analysis by GC/MS
41	T	Hazardous waste monitoring for VOC	Sampling by Tenax loading and analysis by GC/MS

*Whenever the auditee is known, an alphabetical letter is shown. Whenever the auditee is unknown, the name of the agency requesting the audit is shown.

**Audit of instrument calibration procedure.

Table 4. Summary of Performance Audit Results

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avq.)*	Status of Audit**
1A	A	VOST method evaluation	Carbon tetrachloride	21.0 ± 1.0	-50	E
			Chloroform	23.0 ± 1.0	0	
			Perchloroethylene	29.0 ± 2.0	+17	
			Benzene	18.0 ± 1.0	+31	
			Vinyl chloride	31.0 ± 1.0	-50	
1B	A	BAG method evaluation	Carbon tetrachloride	141 ± 3.0	+60	E
			Chloroform	120 ± 3.0	+34	
			Perchloroethylene	126 ± 3.0	+31	
			Benzene	133 ± 3.0	+18	
			Vinyl chloride	154 ± 3.0	-33	
2A	B	VOST method evaluation	Carbon tetrachloride	21.0 ± 1.0	+27	E
			Chloroform	23.0 ± 1.0	+28	
			Perchloroethylene	29.0 ± 2.0	+34	
			Benzene	18.0 ± 1.0	+32	
			Vinyl chloride	31.0 ± 1.0	-66	
2B	B	BAG method evaluation	Carbon tetrachloride	141 ± 3.0	-13	E
			Chloroform	120 ± 3.0	-16	
			Perchloroethylene	126 ± 3.0	-44	
			Benzene	133 ± 3.0	-27	
			Vinyl chloride	154 ± 3.0	-34	
3	C	VOST method evaluation	Carbon tetrachloride	21.0 ± 1.0	+10	E
			Chloroform	23.0 ± 1.0	+20	
			Perchloroethylene	29.0 ± 2.0	NA	
			Benzene	18.0 ± 1.0	-9	
			Vinyl chloride	31.0 ± 1.0	NA	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
4	D	VOST method evaluation	Carbon tetrachloride	21.0 ± 1.0	-14	E
			Chloroform	23.0 ± 1.0	-20	
			Perchloroethylene	29.0 ± 2.0	+17	
			Benzene	18.0 ± 1.0	+6	
			Vinyl chloride	31.0 ± 1.0	-10	
5	Region V U.S. EPA	Hazardous waste incineration trial burn	Carbon tetrachloride	11.0 ± 0.3	+31	E
			Chloroform	45.0 ± 0.9	+20	
			Perchloroethylene	12.0 ± 0.3	NA	
			Benzene	22.3 ± 0.7	NA	
			Vinyl chloride	20.5 ± 0.7	+7	
6	Combustion Research Facility U.S. EPA	VOST method evaluation	Carbon tetrachloride	9.9 ± 0.3	+22	E
			Chloroform	42.0 ± 0.9	0	
			Perchloroethylene	9.6 ± 0.2	+40	
			Benzene	20.0 ± 0.6	+3	
			Vinyl chloride	19.8 ± 0.6	NA	
7	E	Hazardous waste monitoring instrument checkout****	Carbon tetrachloride	11.8 ± 0.4	-3	E
			Chloroform	10.5 ± 0.2	+86	
			Perchloroethylene	67.6 ± 1.6	NA	
			Benzene	46.4 ± 1.5	NA	
			Vinyl chloride	29.3 ± 0.9	NA	
8	F	VOST method evaluation	Carbon tetrachloride	21.0 ± 1.0	NA	F
			Chloroform	23.0 ± 1.0	NA	
			Perchloroethylene	29.0 ± 2.0	NA	
			Benzene	18.0 ± 1.0	NA	
			Vinyl chloride	31.0 ± 1.0	NA	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
9	Region III U.S. EPA	Hazardous waste monitoring instrument checkout****	Carbon tetrachloride	9.3 ± 0.3	NA	F
			Chloroform	40.0 ± 0.8	NA	
			Perchloroethylene	9.4 ± 0.2	NA	
			Benzene	20.0 ± 0.6	NA	
			Vinyl chloride	19.0 ± 0.6	NA	
10	C	Ambient measurement method evaluation	Carbon tetrachloride	323 ± 9.7	+6	E
			Chloroform	128 ± 2.7	+4	
			Perchloroethylene	119 ± 2.9	-3	
			Benzene	379 ± 12.1	-2	
			Vinyl chloride	403 ± 12.1	-3	
11	B	VOST method evaluation	Carbon tetrachloride	11.0 ± 0.3	+5	E
			Chloroform	47.4 ± 1.0	+3	
			Perchloroethylene	11.3 ± 0.3	+5	
			Benzene	25.2 ± 0.8	-7	
			Vinyl chloride	19.8 ± 0.6	-85	
12	B	VOST method evaluation	Carbon tetrachloride	6.6 ± 0.2	+21	E
			Chloroform	7.4 ± 0.2	+12	
			Perchloroethylene	21.9 ± 0.5	+56	
			Benzene	26.0 ± 0.8	+47	
			Vinyl chloride	29.6 ± 0.9	-52	
13	E	Hazardous waste monitoring instrument checkout****	Carbon tetrachloride	11.6 ± 0.4	+11	E
			Chloroform	10.2 ± 0.2	+100	
			Perchloroethylene	67.7 ± 1.6	NA	
			Benzene	45.2 ± 1.5	NA	
			Vinyl chloride	29.8 ± 1.0	NA	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
14	E	Hazardous waste monitoring instrument checkout****	Carbon tetrachloride	24.0 ± 0.7	-25	E
			Chloroform	16.0 ± 0.3	+31	
			Perchloroethylene	14.0 ± 0.3	NA	
			Benzene	25.0 ± 0.8	NA	
			Vinyl chloride	37.0 ± 1.2	NA	
15	Region V U.S. EPA	Ambient air monitoring instrument checkout****	Carbon tetrachloride	11.0 ± 0.3	-45	E
			Chloroform	47.4 ± 1.0	+58	
			Perchloroethylene	11.3 ± 0.3	-68	
			Benzene	25.2 ± 0.8	-56	
			Vinyl chloride	19.8 ± 0.6	NA	
16A	G	Hazardous waste monitoring method evaluation	Carbon tetrachloride	13.4 ± 0.4	+1	E
			Chloroform	12.4 ± 0.3	+5	
			Perchloroethylene	75.6 ± 1.8	+18	
			Benzene	51.2 ± 1.6	-9	
			Vinyl chloride	29.6 ± 0.9	+7	
16B	G	Hazardous waste monitoring method evaluation	Carbon tetrachloride	13.4 ± 0.4	+98	E
			Chloroform	12.4 ± 0.3	+140	
			Perchloroethylene	75.6 ± 1.8	+13	
			Benzene	51.2 ± 1.6	-8	
			Vinyl chloride	29.6 ± 0.9	+6	
17	H	Hazardous waste incineration trial burn	Carbon tetrachloride	9.9 ± 0.3	-19	E
			Chloroform	42.0 ± 0.9	-32	
			Perchloroethylene	9.6 ± 0.2	-14	
			Benzene	20.0 ± 0.6	-21	
			Vinyl chloride	19.8 ± 0.6	-41	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
18A	I	Ambient air monitoring instrument checkout****	Carbon tetrachloride	132 ± 4.0	-17	E
			Chloroform	129 ± 2.7	+16	
			Perchloroethylene	136 ± 3.3	+18	
			Benzene	146 ± 4.7	NA	
			Vinyl chloride	153 ± 4.9	NA	
18A	I	Ambient air monitoring instrument checkout****	Carbon tetrachloride	9.5 ± 0.3	-23	E
			Chloroform	40.6 ± 0.9	+1	
			Perchloroethylene	9.5 ± 0.2	+16	
			Benzene	19.4 ± 0.6	NA	
			Vinyl chloride	20.6 ± 0.7	NA	
18B	I	Ambient air monitoring instrument checkout****	Carbon tetrachloride	132 ± 4.0	+38	E
			Chloroform	129 ± 2.7	+27	
			Perchloroethylene	136 ± 3.3	+34	
			Benzene	146 ± 4.7	+11	
			Vinyl chloride	153 ± 4.9	-5	
18B	I	Ambient air monitoring instrument checkout****	Carbon tetrachloride	9.5 ± 0.3	+58	E
			Chloroform	40.6 ± 0.9	+35	
			Perchloroethylene	9.5 ± 0.2	+332	
			Benzene	19.4 ± 0.6	+240	
			Vinyl chloride	20.6 ± 0.7	-3	
18C	I	Ambient air monitoring instrument checkout****	Carbon tetrachloride	132 ± 4.0	NA	F
			Chloroform	129 ± 2.7	NA	
			Perchloroethylene	136 ± 3.3	NA	
			Benzene	146 ± 4.7	NA	
			Vinyl chloride	153 ± 4.9	NA	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
18C	I	Ambient air monitoring instrument checkout****	Carbon tetrachloride	9.5 ± 0.3	NA	E
			Chloroform	40.6 ± 0.9	NA	
			Perchloroethylene	9.5 ± 0.2	NA	
			Benzene	19.4 ± 0.6	-2	
			Vinyl chloride	20.6 ± 0.7	NA	
19	B	Hazardous waste incineration trial burn	Carbon tetrachloride	11.6 ± 0.3	+28	E
			Chloroform	10.2 ± 0.2	NA	
			Perchloroethylene	67.7 ± 1.6	NA	
			Benzene	45.2 ± 1.4	NA	
			Vinyl chloride	29.8 ± 1.0	NA	
20	J	Hazardous waste incineration trial burn	Carbon tetrachloride	11.6 ± 0.3	NA	F
			Chloroform	10.2 ± 0.2	NA	
			Perchloroethylene	67.7 ± 1.6	NA	
			Benzene	45.2 ± 1.4	NA	
			Vinyl chloride	29.8 ± 1.0	NA	
21	K	Hazardous waste incineration instrument checkout****	Carbon tetrachloride	10.8 ± 0.3	NA	F
			Chloroform	47.1 ± 1.0	NA	
			Perchloroethylene	10.3 ± 0.2	NA	
			Benzene	23.2 ± 0.7	NA	
			Vinyl chloride	20.1 ± 0.6	NA	
22	L	Hazardous waste incineration VOST method evaluation	Carbon tetrachloride	12.7 ± 0.4	-21	E
			Chloroform	12.3 ± 0.3	-27	
			Perchloroethylene	62.2 ± 1.5	-44	
			Benzene	48.0 ± 1.5	-63	
			Vinyl chloride	31.3 ± 1.0	-81	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
23	M	Ambient air monitoring instrument checkout****	Carbon tetrachloride	15.7 ± 0.5	-5	E
			Chloroform	15.2 ± 0.3	+5	
			Perchloroethylene	15.7 ± 0.4	+2	
			Benzene	18.2 ± 0.6	-12	
			Vinyl chloride	15.4 ± 0.5	-29	
24	G	Hazardous waste monitoring method evaluation	Acetonitrile	17.6 ± 1.2	NA	E
			Methyl Ethyl Ketone	19.4 ± 1.1	+18	
			Trichloroethylene	14.7 ± 0.7	+16	
			1,2-Dichloroethane	14.4 ± 0.7	+164	
			Trichlorofluoromethane	15.1 ± 0.5	NA	
			Bromomethane	15.4 ± 0.6	NA	
			Dichlorodiflouromethane	16.3 ± 0.7	NA	
			1,2-Dibromoethane	16.5 ± 0.7	NA	
			1,1,1-Trichloroethane	14.5 ± 0.7	+110	
25	1	Ambient air monitoring instrument checkout****	Carbon tetrachloride	7.1 ± 0.2	-16	E
			Chloroform	8.1 ± 0.2	-26	
			Perchloroethylene	21.1 ± 0.5	+4	
			Benzene	29.9 ± 1.0	-20	
			Vinyl chloride	32.0 ± 1.0	-31	
26	N	Hazardous waste incineration trial burn	Acetonitrile	11.6 ± 0.8	NA	E
			Methyl Ethyl Ketone	6.7 ± 0.4	NA	
			Trichloroethylene	15.4 ± 0.7	NA	
			1,2-Dichloroethane	15.7 ± 0.8	NA	
			Trichlorofluoromethane	15.4 ± 0.5	-42	
			Bromomethane	14.9 ± 0.6	NA	
			Dichlorodiflouromethane	16.6 ± 0.7	-10	
			1,2-Dibromoethane	16.0 ± 0.7	NA	
			1,1,1-Trichloroethane	15.3 ± 0.8	NA	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
27A	1	Ambient air monitoring instrument checkout****	Acetonitrile	146 ± 10	NA	E
			Methyl Ethyl Ketone	170 ± 9	NA	
			Trichloroethylene	145 ± 7	+17	
			1,2-Dichloroethane	157 ± 8	-5	
			Trichlorofluoromethane	155 ± 5	NA	
			Bromomethane	170 ± 7	NA	
			Dichlorodiflouromethane	170 ± 7	NA	
			1,2-Dibromoethane	196 ± 8	+63	
			1,1,1-Trichloroethane	0	erroneous result	
27A	1	Ambient air monitoring instrument checkout****	Acetonitrile	13.8 ± 1.0	NA	E
			Methyl Ethyl Ketone	8.5 ± 0.5	NA	
			Trichloroethylene	15.1 ± 0.7	+10	
			1,2-Dichloroethane	14.7 ± 0.7	+54	
			Trichlorofluoromethane	15.5 ± 0.5	NA	
			Bromomethane	15.4 ± 0.6	NA	
			Dichlorodiflouromethane	16.7 ± 0.7	NA	
			1,2-Dibromoethane	16.8 ± 0.7	+16	
			1,1,1-Trichloroethane	14.8 ± 0.7	+19	
27B	1	Ambient air monitoring instrument checkout****	Acetonitrile	146 ± 10	NA	E
			Methyl Ethyl Ketone	170 ± 9	NA	
			Trichloroethylene	145 ± 7	-30	
			1,2-Dichloroethane	157 ± 8	NA	
			Trichlorofluoromethane	155 ± 5	-3	
			Bromomethane	170 ± 7	NA	
			Dichlorodiflouromethane	170 ± 7	-75	
			1,2-Dibromoethane	196 ± 8	-52	
			1,1,1-Trichloroethane	0	erroneous result	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
27B	1	Ambient air monitoring instrument checkout****	Acetonitrile	13.8 ± 1.0	NA	E
			Methyl Ethyl Ketone	8.5 ± 0.5	NA	
			Trichloroethylene	15.1 ± 0.7	-52	
			1,2-Dichloroethane	14.7 ± 0.7	>-93	
			Trichlorofluoromethane	15.5 ± 0.5	-16	
			Bromomethane	15.4 ± 0.6	NA	
			Dichlorodiflouromethane	16.7 ± 0.7	-71	
			1,2-Dibromoethane	16.8 ± 0.7	-73	
			1,1,1-Trichloroethane	14.8 ± 0.7	-16	
27C	1	Ambient air monitoring instrument checkout****	Acetonitrile	146 ± 10	NA	E
			Methyl Ethyl Ketone	170 ± 9	+2	
			Trichloroethylene	145 ± 7	+36	
			1,2-Dichloroethane	157 ± 8	NA	
			Trichlorofluoromethane	155 ± 5	-63	
			Bromomethane	170 ± 7	NA	
			Dichlorodiflouromethane	170 ± 7	-2	
			1,2-Dibromoethane	196 ± 8	NA	
			1,1,1-Trichloroethane	0	errouneous result	
27C	1	Ambient air monitoring instrument checkout****	Acetonitrile	13.8 ± 1.0	NA	E
			Methyl Ethyl Ketone	8.5 ± 0.5	+124	
			Trichloroethylene	15.1 ± 0.7	-1	
			1,2-Dichloroethane	14.7 ± 0.7	NA	
			Trichlorofluoromethane	15.5 ± 0.5	+158	
			Bromomethane	15.4 ± 0.6	NA	
			Dichlorodiflouromethane	16.7 ± 0.7	+8	
			1,2-Dibromoethane	16.8 ± 0.7	NA	
			1,1,1-Trichloroethane	14.8 ± 0.7	+42	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
28	O	Hazardous waste incineration trial burn	Carbon tetrachloride	9.5 ± 0.3	+22	E
			Chloroform	40.6 ± 0.9	+9	
			Perchloroethylene	9.5 ± 0.2	+16	
			Benzene	19.4 ± 0.6	+17	
			Vinyl chloride	20.6 ± 0.7	-13	
29	B	Hazardous waste incineration sampling method evaluation	Carbon tetrachloride	11.4 ± 0.3	+5	E
			Chloroform	43.9 ± 0.9	+8	
			Perchloroethylene	10.3 ± 0.2	+20	
			Benzene	19.9 ± 0.6	+23	
			Vinyl chloride	22.1 ± 0.7	NA	
30A	P	Ambient air monitoring method evaluation	Acetonitrile	13.8 ± 1.0	NA	E
			Methyl Ethyl Ketone	8.5 ± 0.5	NA	
			Trichloroethylene	15.1 ± 0.7	+12	
			1,2-Dichloroethane	14.7 ± 0.7	NA	
			Trichlorofluoromethane	15.5 ± 0.5	NA	
			Bromomethane	15.4 ± 0.6	NA	
			Dichlorodiflouromethane	16.7 ± 0.7	NA	
			1,2-Dibromoethane	16.8 ± 0.7	NA	
			1,1,1-Trichloroethane	14.8 ± 0.7	NA	
30B	P	Ambient air monitoring method evaluation	Acetonitrile	13.8 ± 1.0	NA	E
			Methyl Ethyl Ketone	8.5 ± 0.5	NA	
			Trichloroethylene	15.1 ± 0.7	70.2	
			1,2-Dichloroethane	14.7 ± 0.7	NA	
			Trichlorofluoromethane	15.5 ± 0.5	NA	
			Bromomethane	15.4 ± 0.6	NA	
			Dichlorodiflouromethane	16.7 ± 0.7	NA	
			1,2-Dibromoethane	16.8 ± 0.7	NA	
			1,1,1-Trichloroethane	14.8 ± 0.7	NA	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
31	Q	Ambient air monitoring instrument checkout****	Carbon tetrachloride	299 ± 9.0	-56	E
			Chloroform	126 ± 2.6	-33	
			Perchloroethylene	103 ± 2.5	-60	
			Benzene	378 ± 12.1	+18	
			Vinyl chloride	409 ± 13.1	-47	
32	B	Hazardous waste incineration sampling method evaluation	Carbon tetrachloride	9.6 ± 0.3	-1	E
			Chloroform	37.1 ± 0.8	+11	
			Perchloroethylene	9.1 ± 0.2	-18	
			Benzene	19.4 ± 0.6	+7	
			Vinyl chloride	20.4 ± 0.7	NA	
33	B	Hazardous waste incineration sampling method evaluation	Carbon tetrachloride	37.7 ± 1.1	-25	E
			Chloroform	8.3 ± 0.2	-24	
			Perchloroethylene	8.4 ± 0.2	-17	
			Benzene	40.7 ± 1.3	-26	
			Vinyl chloride	50.8 ± 1.6	NA	
34	R	Ambient air monitoring instrument checkout****	Carbon tetrachloride	9.6 ± 0.3		A
			Chloroform	37.1 ± 0.8		
			Perchloroethylene	9.1 ± 0.2		
			Benzene	19.4 ± 0.6		
			Vinyl chloride	20.4 ± 0.7		
35	C	Ambient air monitoring instrument checkout****	Carbon tetrachloride	11.4 ± 0.3	NA	E
			Chloroform	43.9 ± 0.9	+25	
			Perchloroethylene	10.3 ± 0.2	+25	
			Benzene	19.9 ± 0.6	+25	
			Vinyl chloride	22.1 ± 0.7	NA	

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RTI Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
36	C	Ambient air monitoring instrument checkout****	Acetonitrile	13.8 ± 1.0	NA	E
			Methyl Ethyl Ketone	8.5 ± 0.5	NA	
			Trichloroethylene	15.1 ± 0.7	+20	
			1,2-Dichloroethane	14.7 ± 0.7	NA	
			Trichlorofluoromethane	15.5 ± 0.5	NA	
			Bromomethane	15.4 ± 0.6	NA	
			Dichlorodiflouromethane	16.7 ± 0.7	NA	
			1,2-Dibromoethane	16.8 ± 0.7	NA	
			1,1,1-Trichloroethane	14.8 ± 0.7	+29	
37	S	Hazardous waste incineration VOST method evaluation	Acetonitrile	7.9 ± 0.6		A
			Methyl Ethyl Ketone	9.6 ± 0.5		
			Trichloroethylene	9.0 ± 0.4		
			1,2-Dichloroethane	9.8 ± 0.5		
			Trichlorofluoromethane	9.4 ± 0.3		
			Bromomethane	10.8 ± 0.4		
			Dichlorodiflouromethane	9.9 ± 0.4		
			1,2-Dibromoethane	10.2 ± 0.4		
			1,1,1-Trichloroethane	10.1 ± 0.5		
38	L	Ambient air monitoring instrument checkout****	Carbon tetrachloride	86.2 ± 2.6		A
			Chloroform	331.0 ± 7.0		
			Perchloroethylene	307.0 ± 7.4		
			Benzene	137.0 ± 4.4		
			Vinyl chloride	150.0 ± 4.8		

(Continued)

Table 4. Summary of Performance Audit Results (Continued)

Audit No.	Client***	Use of Audit Material	Audit Material	RT1 Audit Conc. (ppb)	Client Audit % Bias (avg.)*	Status of Audit**
39	L	Ambient air monitoring instrument checkout****	Acetonitrile	106 ± 7		A
			Methyl Ethyl Ketone	123 ± 7		
			Trichloroethylene	142 ± 7		
			1,2-Dichloroethane	139 ± 7		
			Trichlorofluoromethane	161 ± 6		
			Bromomethane	168 ± 7		
			Dichlorodiflouromethane	170 ± 7		
			1,2-Dibromoethane	192 ± 8		
			1,1,1-Trichloroethane	0		
40	T	Hazardous waste monitoring for VOC	Carbon tetrachloride	11.4 ± 0.3		A
			Chloroform	43.9 ± 0.9		
			Perchloroethylene	10.3 ± 0.2		
			Benzene	19.9 ± 0.6		
			Vinyl chloride	22.1 ± 0.7		
41	T	Hazardous waste monitoring for VOC	Acetonitrile	13.8 ± 1.0		A
			Methyl Ethyl Ketone	8.5 ± 0.5		
			Trichloroethylene	15.1 ± 0.7		
			1,2-Dichloroethane	14.7 ± 0.7		
			Trichlorofluoromethane	15.5 ± 0.5		
			Bromomethane	15.4 ± 0.6		
			Dichlorodiflouromethane	16.7 ± 0.7		
			1,2-Dibromoethane	16.8 ± 0.7		
			1,1,1-Trichloroethane	14.8 ± 0.7		

NA = Not analyzed

$$\text{*Client \% Bias} = 100 \times \frac{\text{Client Measured Concentration} - \text{RT1 Measured Concentration}}{\text{RT1 Measured Concentration}}$$

**Status Codes: A = Cylinder shipped; audit results not yet received
B = Audit results received
C = Audit results submitted to EPA
D = Audit results received, audit report submitted to EPA, cylinder not yet returned from client
E = Audit complete
F = Audit completed without analysis of audit materials by client

***Whenever the auditee is known, an alphabetical letter is shown. Whenever the auditee is unknown, the name of the agency requesting the audit is shown.

****Audit of instrument calibration procedure.

SECTION 4.0
STABILITY STUDIES

An ideal calibration standard or audit material should be stable over its total time of usage. It may be concluded that such standards or materials are stable if reanalyses over time do not exceed the total uncertainty of the analyte concentrations at the 95 percent confidence limits.

On this project, the gas mixtures were analyzed twice by the manufacturer before shipment to RTI. These analyses were performed to demonstrate that the components in the cylinder were stable at the manufacturer facility before shipment to RTI. The gas mixtures are then analyzed at RTI upon receipt from the specialty gas vendor to corroborate the vendors's analysis. The gas mixtures are again analyzed at 2 months, 6 months, 12 months and 18 months following the initial RTI analysis to determine the stability of the gas mixtures. The results of the analyses of the manufacturer, RTI and NBS primary standards are summarized in the stability data tables shown in Appendix A.

Relative accuracies of the cylinder gas analyses for Group I and Group II compounds have been determined using NBS primary standards on each day of RTI analysis. The method used by NBS to estimate the total uncertainty of NBS primary standards at the 95 percent confidence level has been reported.[1] The analysis results along with the total uncertainty at 95 percent confidence limits for Group I and Group II compounds are included in the stability data tables in Appendix A. These primary standards have been assessed for stability by NBS and no change in concentrations have been observed that have exceeded the 95 percent uncertainties of the concentrations. Also, NBS still maintains a continued QA program on these primary standards in which reanalyses are conducted over time to verify that the concentrations have not changed.

An examination of the stability data in Appendix A shows values for Group I and Group II cylinders usually vary by less than 10 percent for 4 or 5 analyses over a 1-year period. This variation indicates the imprecision of the measurement process. The possible sources of experimental error that contribute to this variability include: (1) the variability of the sampling injection technique used for analyses; and (2) the instrumental variability in operating and detector parameters. Each of these sources of variability contributes to the net uncertainty of the resulting data presented in Appendix A. The procedures used for the determination of day- to-day measurement uncertainty (repeatability) for Group I and Group II compounds have recently been published.[2] Estimates of total uncertainty (repeatability) for Group I compounds have been determined to be in the range of 2.1-3.2% (coefficient of variation) at 95% confidence limits. The estimate of total uncertainty for Group II compounds have been determined to be in the range of 3.4-7.0% (coefficient of variation) at 95% confidence limits.

SECTION 5
SUMMARY AND CONCLUSIONS

A repository of 14 gaseous organic compounds at parts-per-billion levels in compressed gas cylinders has been used successfully in audits to assess the relative accuracy of analytical systems, especially those used during hazardous waste trial burn tests and ambient air monitoring. The repository consists of three mixtures of five, eight and nine organic compounds each. These mixtures were blended by a commercial specialty gas supplier in aluminum cylinders in a balance gas of nitrogen. The five component mixture (Group 1) contains carbon tetrachloride, chloroform, perchloroethylene, vinyl chloride and benzene. The nine component mixture (Group 11) includes trichloroethylene, 1,2-dichloroethane, 1,2-dibromoethane, acetonitrile, trichlorofluoromethane (F-11), dichlorodifluoromethane (F-12), bromomethane, methyl ethyl ketone and 1,1,1-trichloroethane. The eight component mixture (Group 111) included pyridine, vinylidene chloride, 1,1,2-trichloro 1,2,2-trifluoroethane (F- 113), 1,2-dichloro 1,1,2,2- tetrafluoroethane (F-114), acetone, 1,4-dioxane, toluene, and chlorobenzene.

Stability studies for 14 compounds (Group 1 and Group 11) have been performed to determine the feasibility of using them as audit materials. Results indicate that all of the organics tested are adequately stable to be used as reliable audit materials. The Group 111 compounds will not be available for audits until stability of the compounds have been established. 1f the data indicates that the Group 111 compounds are stable, Group 111 mixtures should be available for audits on or after December 1, 1985.

Subsequent to completion of the stability studies, 41 performance audits have been initiated to date with Group 1 and Group 11 cylinders and 36 are complete. Generally, the audit results are within ± 50 percent of the audit concentrations measured by RT1.

REFERENCES

1. Rhoderick, G. C., W. F. Cuthrell and W. L. Zielinski, Jr., "A Gravimetric Technique for the Preparation of Accurate Trace Organic Gas Standards", Proceedings APCA International Specialty Conference on Quality Assurance in Air Pollution Measurements, PP 239-246, 1985.

2. Jayanty, R. K. M., S. W. Cooper, C. E. Decker and D. J. von Lehmden, "Evaluation of Parts-Per-Billion (PPB) Organic Cylinder Gases for Use as Audits During Hazardous Waste Trial Burn Tests". J. Air Pollution Control Association, Vol. 39, November 1985.

APPENDIX A

STABILITY STUDY FOR GROUP I COMPOUNDS
STABILITY STUDY FOR GROUP II COMPOUNDS

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C1

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(305)	(302)	(305)	(305)	---
1st Analysis Date PPB	10/13/83 (300)	10/13/83 (220)	10/13/83 (317)	11/15/83 (269)	11/15/83 (310)
2nd Analysis Date PPB	12/14/83 (269)	12/14/83 (253)	12/14/83 (298)	12/12/83 (282)	12/12/83 (314)
RTI ANALYSIS					
1st RTI Analysis Date PPB	12/30/83 (283 ± 8.5)	12/30/83 (222 ± 4.7)	12/30/83 (373 ± 9.0)	1/12/84 (289 ± 9.2)	1/12/84 (325 ± 10.4)
2nd RTI Analysis Day* PPB	62 (300 ± 9.0)	62 (228 ± 4.8)	62 (375 ± 9.0)	62 (287 ± 9.2)	62 (328 ± 10.5)
3rd RTI Analysis Day* PPB	241 (277 ± 8.3)	241 (221 ± 4.6)	241 (347 ± 8.3)	235 (304 ± 9.7)	235 (325 ± 10.4)
4th RTI Analysis Day* PPB	404 (277 ± 8.3)	404 (224 ± 4.7)	404 (356 ± 8.5)	378 (286 ± 9.2)	378 (334 ± 10.7)
5th RTI Analysis Day* PPB	on audit	on audit	on audit	(302 ± 97)	(319 ± 10.2)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	NA	NA	NA	NA	NA
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
2nd RTI Analysis Day PPB	62 (164 ± 4.9)	62 (130 ± 2.7)	62 (151 ± 3.6)	62 (192 ± 6.1)	62 (192 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C1

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	241 (156 ± 4.7)	241 (132 ± 2.8)	241 (147 ± 3.5)	235 (191 ± 6.1)	235 (191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day PPB	404 (156 ± 4.7)	404 (128 ± 2.7)	404 (143 ± 3.4)	378 (200 ± 6.4)	378 (195 ± 6.2)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day PPB	500 (141 ± 4.2)	500 (115 ± 2.4)	500 (128 ± 3.1)	505 (139 ± 4.4)	505 (149 ± 4.8)
NBS Concentration** PPB	(141 ± 3)	(115 ± 3)	(128 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 5th RTI analysis than on the 1st, 2nd, 3rd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C2

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(319)	(316)	(319)	(319)	---
1st Analysis Date PPB	10/13/83 (301)	10/13/83 (243)	10/13/83 (356)	12/12/83 (317)	12/12/83 (292)
2nd Analysis Date PPB	12/14/83 (295)	12/14/83 (258)	12/14/83 (342)	12/14/83 (294)	12/14/83 (293)
RTI ANALYSIS					
1st RTI Analysis Date PPB	12/30/83 (315 ± 9.5)	12/30/83 (226 ± 4.7)	12/30/83 (425 ± 10.2)	1/12/84 (305 ± 9.8)	1/12/84 (295 ± 9.4)
2nd RTI Analysis Day* PPB	62 (327 ± 9.8)	62 (233 ± 4.9)	62 (436 ± 10.5)	62 (314 ± 10.0)	62 (303 ± 9.7)
3rd RTI Analysis Day* PPB	241 (305 ± 9.2)	241 (230 ± 4.8)	241 (406 ± 9.7)	235 (326 ± 10.4)	235 (304 ± 9.7)
4th RTI Analysis Day* PPB	404 (305 ± 9.2)	404 (229 ± 4.8)	404 (407 ± 9.8)	378 (313 ± 10.0)	378 (309 ± 9.9)
5th RTI Analysis Day* PPB	500 (306 ± 9.2)	500 (223 ± 4.7)	500 (398 ± 9.6)	502 (325 ± 10.4)	502 (308 ± 9.9)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	NA	NA	NA	NA	NA
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
2nd RTI Analysis Day PPB	62 (164 ± 4.9)	62 (130 ± 2.7)	62 (151 ± 3.6)	62 (192 ± 6.1)	62 (192 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C2

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	241	241	241	235	235
PPB	(156 ± 4.7)	(132 ± 2.8)	(147 ± 3.5)	(191 ± 6.1)	(191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day	404	404	404	378	378
PPB	(156 ± 4.7)	(128 ± 2.7)	(143 ± 3.4)	(200 ± 6.4)	(195 ± 6.2)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day	500	500	500	502	502
PPB	(141 ± 4.2)	(115 ± 2.4)	(128 ± 3.1)	(137 ± 4.4)	(145 ± 4.6)
NBS Concentration** PPB	(141 ± 3)	(115 ± 3)	(128 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 5th RTI analysis than on the 1st, 2nd, 3rd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C3

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(294)	(291)	(293)	(294)	(290)
1st Analysis Date	10/13/83	10/13/83	10/13/83	11/15/83	11/15/83
PPB	(308)	(223)	(321)	(271)	(287)
2nd Analysis Date	12/14/83	12/14/83	12/14/83	12/12/83	12/12/83
PPB	(272)	(256)	(299)	(284)	(290)
RTI ANALYSIS					
1st RTI Analysis Date	12/30/83	12/30/83	12/30/83	1/12/84	1/12/84
PPB	(287 ± 8.6)	(224 ± 4.7)	(373 ± 9.0)	(288 ± 9.2)	(295 ± 9.4)
2nd RTI Analysis Day*	62	62	62	62	62
PPB	(303 ± 9.1)	(234 ± 4.9)	(369 ± 8.9)	(289 ± 9.2)	(302 ± 9.7)
3rd RTI Analysis Day*	241	241	241	235	235
PPB	(283 ± 8.5)	(230 ± 4.8)	(352 ± 8.4)	(300 ± 9.6)	(306 ± 9.8)
4th RTI Analysis Day*	404	404	404	378	378
PPB	(280 ± 8.4)	(229 ± 4.8)	(354 ± 8.5)	(289 ± 9.2)	(308 ± 9.9)
5th RTI Analysis Day*	500	500	500	502	502
PPB	(281 ± 8.4)	(223 ± 4.7)	(347 ± 8.3)	(302 ± 9.7)	(308 ± 9.9)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	NA	NA	NA	NA	NA
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
2nd RTI Analysis Day	62	62	62	62	62
PPB	(164 ± 4.9)	(130 ± 2.7)	(151 ± 3.6)	(192 ± 6.1)	(192 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C3

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	241 (156 ± 4.7)	241 (132 ± 2.8)	241 (147 ± 3.5)	235 (191 ± 6.1)	235 (191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day PPB	404 (156 ± 4.7)	404 (128 ± 2.7)	404 (143 ± 3.4)	378 (200 ± 6.4)	378 (195 ± 6.2)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day PPB	500 (141 ± 4.2)	500 (115 ± 2.4)	500 (128 ± 3.1)	502 (137 ± 4.4)	502 (145 ± 4.6)
NBS Concentration** PPB	(141 ± 3)	(115 ± 3)	(128 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 5th RTI analysis than on the 1st, 2nd, 3rd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C4

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(268)	(271)	(271)	(274)	-?-
1st Analysis Date	12/09/83	12/09/83	12/09/83	12/02/83	12/02/83
PPB	(267)	(232)	(281)	(248)	(283)
2nd Analysis Date	12/14/83	12/14/83	12/14/83	12/12/83	12/12/83
PPB	(256)	(241)	(259)	(262)	(287)
RTI ANALYSIS					
1st RTI Analysis Date	12/30/83	12/30/83	12/30/83	1/12/84	1/12/84
PPB	(270 ± 8.1)	(211 ± 4.4)	(308 ± 7.4)	(263 ± 8.4)	(291 ± 9.3)
2nd RTI Analysis Day*	62	62	62	62	62
PPB	(278 ± 8.3)	(214 ± 4.5)	(317 ± 7.6)	(263 ± 8.4)	(296 ± 9.5)
3rd RTI Analysis Day*	241	241	241	235	235
PPB	(267 ± 8.0)	(214 ± 4.5)	(299 ± 7.2)	(281 ± 9.0)	(300 ± 9.6)
4th RTI Analysis Day*	404	404	404	378	378
PPB	(266 ± 8.0)	(216 ± 4.5)	(311 ± 7.5)	(266 ± 8.5)	(301 ± 9.6)
5th RTI Analysis Day*	500	500	500	502	502
PPB	(265 ± 8.0)	(208 ± 4.4)	(295 ± 7.1)	(277 ± 8.9)	(302 ± 9.7)
RTI QUALITY CONTROL**					
1st RTI Analysis Date					
PPB	NA	NA	NA	NA	NA
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
2nd RTI Analysis Day	62	62	62	62	62
PPB	(164 ± 4.9)	(130 ± 2.7)	(151 ± 3.6)	(192 ± 6.1)	(192 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C4

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	241	241	241	235	235
PPB	(156 ± 4.7)	(132 ± 2.8)	(147 ± 3.5)	(191 ± 6.1)	(191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day	404	404	404	378	378
PPB	(156 ± 4.7)	(128 ± 2.7)	(143 ± 3.4)	(200 ± 6.4)	(195 ± 6.2)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day	500	500	500	502	502
PPB	(141 ± 4.2)	(115 ± 2.4)	(128 ± 3.1)	(137 ± 4.4)	(145 ± 4.6)
NBS Concentration** PPB	(141 ± 3)	(115 ± 3)	(128 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 5th RTI analysis than on the 1st, 2nd, 3rd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C5

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(133)	(132)	(133)	(134)	150
1st Analysis Date	10/31/83	10/31/83	10/31/83	11/16/83	11/16/83
PPB	(122)	(123)	(124)	(127)	(143)
2nd Analysis Date	12/10/83	12/10/83	12/10/83	12/13/83	12/13/83
PPB	(118)	(130)	(119)	(131)	(146)
RTI ANALYSIS					
1st RTI Analysis Date	12/30/83	12/30/83	12/30/83	1/17/84	1/17/84
PPB	(133 ± 4.1)	(125 ± 2.6)	(138 ± 3.3)	(132 ± 4.2)	(154 ± 4.9)
2nd RTI Analysis Day*	62	62	62	54	54
PPB	(139 ± 4.2)	(130 ± 2.7)	(144 ± 3.5)	(139 ± 4.4)	(152 ± 4.9)
3rd RTI Analysis Day*	242	242	242	230	230
PPB	(132 ± 4.0)	(129 ± 2.7)	(136 ± 3.3)	(146 ± 4.7)	(153 ± 4.9)
4th RTI Analysis Day*	404	404	404	374	374
PPB	(124 ± 3.7)	(125 ± 2.6)	(135 ± 3.2)	(140 ± 4.5)	(154 ± 4.9)
5th RTI Analysis Day*	501	501	501	498	498
PPB	(132 ± 4.0)	(128 ± 2.7)	(137 ± 3.3)	(139 ± 4.4)	(154 ± 4.9)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	----	----	----	1/17/84	1/17/84
PPB	NA	NA	NA	(135)	(155)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day	62	62	62	54	54
PPB	(164 ± 4.9)	(130 ± 2.7)	(151 ± 3.6)	(141 ± 4.5)	(153 ± 4.9)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C5

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	242	242	242	230	230
PPB	(157 ± 4.7)	(133 ± 2.8)	(144 ± 3.5)	(147 ± 4.7)	(153 ± 4.9)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day	404	404	404	374	374
PPB	(156 ± 4.7)	(128 ± 2.7)	(143 ± 3.4)	(147 ± 4.7)	(152 ± 4.9)
NBS Concentration** PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)**	(192 ± 4)**
5th RTI Analysis Day	501	501	501	498	498
PPB	(142 ± 4.3)	(115 ± 2.4)	(126 ± 3.0)	(139 ± 4.4)	(154 ± 4.9)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 4th and 5th RTI analysis than on the 1st, 2nd and 3rd analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C6

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(134)	(133)	(134)	(135)	(15)
1st Analysis Date	10/31/83	10/31/83	10/31/83	11/16/83	11/16/83
PPB	(126)	(126)	(128)	(128)	(142)
2nd Analysis Date	12/10/83	12/10/83	12/10/83	12/12/83	12/12/83
PPB	(115)	(129)	(114)	(133)	(143)
RTI ANALYSIS					
1st RTI Analysis Date	12/30/83	12/30/83	12/30/83	1/17/84	1/17/84
PPB	(134 ± 4.0)	(124 ± 2.6)	(137 ± 3.3)	(136 ± 4.4)	(155 ± 5.0)
2nd RTI Analysis Day*	62	62	62	54	54
PPB	(137 ± 4.1)	(128 ± 2.7)	(140 ± 3.4)	(138 ± 4.4)	(150 ± 4.8)
3rd RTI Analysis Day*	242	242	242	230	230
PPB	(131 ± 3.9)	(129 ± 2.7)	(135 ± 3.2)	(147 ± 4.7)	(152 ± 4.9)
4th RTI Analysis Day*	404	404	404	374	374
PPB	(129 ± 3.9)	(126 ± 2.6)	(135 ± 3.2)	(140 ± 4.5)	(148 ± 4.7)
5th RTI Analysis Day*	501	501	501	498	498
PPB	(132 ± 4.0)	(128 ± 2.7)	(137 ± 3.3)	(138 ± 4.4)	(153 ± 4.9)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	----	----	----	1/17/84	1/17/84
PPB	NA	NA	NA	(135 ± 4.3)	(155 ± 5.0)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day	62	62	62	54	54
PPB	(164 ± 4.9)	(130 ± 2.7)	(151 ± 3.6)	(141 ± 4.5)	(153 ± 4.9)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C6

ACTIVITY	COMPOUND				
	Carbon tetra-chloride	Chloroform	Perchloro-ethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	242 (157 ± 4.7)	242 (133 ± 2.8)	242 (144 ± 3.5)	230 (147 ± 4.7)	230 (153 ± 4.9
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day PPB	404 (156 ± 4.7)	404 (128 ± 2.7)	404 (143 ± 3.4)	374 (147 ± 4.7)	374 (152 ± 4.9)
NBS Concentration** PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)**	(192 ± 4)**
5th RTI Analysis Day PPB	501 (142 ± 4.3)	501 (115 ± 2.4)	501 (126 ± 3.0)	498 (139 ± 4.4)	498 (154 ± 4.9)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 4th and 5th RTI analysis than on the 1st, 2nd and 3rd analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C7

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(134)	(132)	(133)	(134)	(150)
1st Analysis Date	10/31/83	10/31/83	10/31/83	12/01/83	12/01/83
PPB	(122)	(124)	(124)	(127)	(146)
2nd Analysis Date	12/10/83	12/10/83	12/10/83	12/13/83	12/13/83
PPB	(117)	(126)	(113)	(131)	(143)
RTI ANALYSIS					
1st RTI Analysis Date	12/30/83	12/30/83	12/30/83	1/17/84	1/17/84
PPB	(132 ± 4.0)	(125 ± 2.6)	(139 ± 3.3)	(132 ± 4.2)	(155 ± 5.0)
2nd RTI Analysis Day*	62	62	62	54	54
PPB	(135 ± 4.1)	(127 ± 2.7)	(142 ± 3.4)	(138 ± 4.4)	(152 ± 4.9)
3rd RTI Analysis Day*	242	242	242	230	230
PPB	(133 ± 4.0)	(129 ± 2.7)	(135 ± 3.2)	(145 ± 4.6)	(154 ± 4.9)
4th RTI Analysis Day*	404	404	404	374	374
PPB	(128 ± 3.8)	(125 ± 2.6)	(140 ± 3.4)	(141 ± 4.5)	(156 ± 5.0)
5th RTI Analysis Day*	501	501	501	498	498
PPB	(131 ± 3.9)	(125 ± 2.6)	(137 ± 3.3)	(137 ± 4.4)	(156 ± 5.0)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	----	----	----	1/17/84	1/17/84
PPB	NA	NA	NA	(135 ± 4.3)	(155 ± 5.0)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day	62	62	62	54	54
PPB	(164 ± 4.9)	(130 ± 2.7)	(151 ± 3.6)	(141 ± 4.5)	(153 ± 4.9)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C7

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	242	242	242	230	230
PPB	(157 ± 4.7)	(133 ± 2.8)	(144 ± 3.5)	(147 ± 4.7)	(153 ± 4.9)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day	404	404	404	374	374
PPB	(156 ± 4.7)	(128 ± 2.7)	(143 ± 3.4)	(147 ± 4.7)	(152 ± 4.9)
NBS Concentration** PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)**	(192 ± 4)**
5th RTI Analysis Day	501	501	501	498	498
PPB	(142 ± 4.3)	(115 ± 2.40	(126 ± 3.0)	(139 ± 4.4)	(154 ± 4.9)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 4th and 5th RTI analysis than on the 1st, 2nd and 3rd analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C8

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(128)	(126)	(127)	(128)	(150)
1st Analysis Date	10/31/83	10/31/83	10/31/83	11/16/83	11/16/83
PPB	(117)	(119)	(125)	(121)	(147)
2nd Analysis Date	12/10/83	12/10/83	12/10/83	12/13/83	12/13/83
PPB	(113)	(126)	(116)	(125)	(148)
RTI ANALYSIS					
1st RTI Analysis Date	12/30/83	12/30/83	12/30/83	1/17/84	1/17/84
PPB	(127 ± 3.8)	(119 ± 2.5)	(131 ± 3.1)	(127 ± 4.1)	(158 ± 5.1)
2nd RTI Analysis Day*	62	62	62	54	54
PPB	(131 ± 3.9)	(122 ± 2.6)	(134 ± 3.2)	(133 ± 4.3)	(154 ± 4.9)
3rd RTI Analysis Day*	242	242	242	230	230
PPB	(127 ± 3.8)	(123 ± 2.6)	(129 ± 3.1)	(140 ± 4.5)	(153 ± 4.9)
4th RTI Analysis Day*	404	404	404	374	374
PPB	(124 ± 3.7)	(117 ± 2.5)	(131 ± 3.1)	(143 ± 4.6)	(154 ± 4.9)
5th RTI Analysis Day*					
PPB	on audit	on audit	on audit	on audit	on audit
RTI QUALITY CONTROL**					
1st RTI Analysis Date	----	----	----	1/17/84	1/17/84
PPB	NA	NA	NA	(135 ± 4.3)	(155 ± 5.0)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day	62	62	62	54	54
PPB	(164 ± 4.9)	(130 ± 2.7)	(151 ± 3.6)	(141 ± 4.5)	(153 ± 4.9)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C8

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	242 (157 ± 4.7)	242 (133 ± 2.8)	242 (144 ± 3.5)	230 (147 ± 4.7)	230 (153 ± 4.9)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day PPB	404 (156 ± 4.7)	404 (128 ± 2.7)	404 (143 ± 3.4)	374 (147 ± 4.7)	374 (152 ± 4.9)
NBS Concentration** PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)**	(192 ± 4)**
5th RTI Analysis Day PPB	501 (142 ± 4.3)	501 (115 ± 2.4)	501 (126 ± 3.0)	498 (139 ± 4.4)	498 (154 ± 4.9)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 4th and 5th RTI analysis than on the 1st, 2nd and 3rd analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C9

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(70.8)	(70.0)	(70.6)	(71.0)	(70.0)
1st Analysis Date	10/25/83	10/25/83	10/25/83	11/28/83	11/28/83
PPB	(72.5)	(68.9)	(72.7)	(67.2)	(70.6)
2nd Analysis Date	12/12/83	12/12/83	12/12/83	12/13/83	12/13/83
PPB	(68.3)	(72.3)	(69.8)	(73.1)	(69.6)
RTI ANALYSIS					
1st RTI Analysis Date	1/04/84	1/04/84	1/04/84	1/17/84	1/17/84
PPB	(72.8 ± 2.2)	(65.3 ± 1.4)	(74.6 ± 1.8)	(76.2 ± 2.4)	(72.9 ± 2.3)
2nd RTI Analysis Day*	58	58	58	51	51
PPB	(73.7 ± 2.2)	(68.6 ± 1.4)	(76.2 ± 1.8)	(73.2 ± 2.3)	(73.1 ± 2.3)
3rd RTI Analysis Day*					
PPB	on audit	on audit	on audit	on audit	on audit
4th RTI Analysis Day*					
PPB	on audit	on audit	on audit	on audit	on audit
5th RTI Analysis Day*	497	497	497	499	499
PPB	(71.7 ± 2.2)	(68.8 ± 1.4)	(71.6 ± 1.7)	(72.6 ± 2.3)	(71.0 ± 2.3)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/04/84	1/04/84	1/04/84	1/17/84	1/17/84
PPB	(144 ± 4.3)	(114 ± 2.4)	(127 ± 3.0)	(135 ± 4.3)	(155 ± 5.0)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day	58	58	58	51	51
PPB	(147 ± 4.4)	(116 ± 2.4)	(134 ± 3.2)	(17.0 ± 0.5)	(15.0 ± 0.5)
NBS Concentration** PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(17 ± 1)**	(15 ± 1)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C9

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	240 (146 ± 4.4)	240 (120 ± 2.5)	240 (131 ± 3.1)	231 (146 ± 4.7)	231 (152 ± 4.9)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day PPB	401 (142 ± 4.3)	401 (120 ± 2.5)	401 (127 ± 3.0)	377 (136 ± 4.4)	377 (150 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
5th RTI Analysis Day PPB	497 (141 ± 4.2)	497 (116 ± 2.4)	497 (129 ± 3.1)	499 (136 ± 4.4)	499 (149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C10

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(66.0)	(65.2)	(65.8)	(66.2)	(70.0)
1st Analysis Date PPB	10/25/83 (65.2)	10/25/83 (64.8)	10/25/83 (67.9)	11/28/83 (61.0)	11/28/83 (70.1)
2nd Analysis Date PPB	12/12/83 (62.5)	12/12/83 (66.1)	12/12/83 (64.6)	12/13/83 (66.0)	12/13/83 (67.5)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/04/84 (66.5 ± 2.0)	1/04/84 (58.6 ± 1.2)	1/04/84 (67.7 ± 1.6)	1/17/84 (68.7 ± 2.2)	1/17/84 (71.3 ± 2.3)
2nd RTI Analysis Day* PPB	58 (65.8 ± 2.0)	58 (60.6 ± 1.3)	58 (68.4 ± 1.6)	51 (66.4 ± 2.1)	51 (71.5 ± 2.3)
3rd RTI Analysis Day* PPB	240 (67.6 ± 2.0)	240 (64.6 ± 1.4)	240 (69.4 ± 1.7)	231 (72.0 ± 2.3)	231 (71.6 ± 2.3)
4th RTI Analysis Day* PPB	401 (65.2 ± 2.0)	401 (63.6 ± 1.3)	401 (71.7 ± 1.7)	377 (70.4 ± 2.3)	377 (68.5 ± 2.2)
5th RTI Analysis Day* PPB	497 (64.0 ± 1.9)	497 (62.7 ± 1.3)	497 (64.3 ± 1.5)	499 (66.0 ± 2.1)	499 (69.0 ± 2.2)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/04/84 (144 ± 4.3)	1/04/84 (114 ± 2.4)	1/04/84 (127 ± 3.0)	1/17/84 (135 ± 4.3)	1/17/84 (155 ± 5.0)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day PPB	58 (147 ± 4.4)	58 (116 ± 2.4)	58 (134 ± 3.2)	51 (17.0 ± 0.5)	51 (15.0 ± 0.5)
NBS Concentration** PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(17 ± 1)**	(15 ± 1)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C10

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	240 (146 ± 4.4)	240 (120 ± 2.5)	240 (131 ± 3.1)	231 (146 ± 4.7)	231 (152 ± 4.9)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day PPB	401 (142 ± 4.3)	401 (120 ± 2.5)	401 (127 ± 3.0)	377 (136 ± 4.4)	377 (150 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
5th RTI Analysis Day PPB	497 (141 ± 4.2)	497 (116 ± 2.4)	497 (129 ± 3.1)	499 (136 ± 4.4)	499 (149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C11

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(66.6)	(65.8)	(66.3)	(66.7)	(70.0)
1st Analysis Date PPB	10/25/83 (65.4)	10/25/83 (62.4)	10/25/83 (65.5)	12/02/83 (61.7)	12/02/83 (66.5)
2nd Analysis Date PPB	12/12/83 (62.3)	12/12/83 (65.1)	12/12/83 (64.8)	12/13/83 (65.3)	12/13/83 (67.7)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/04/84 (66.5 ± 2.0)	1/04/84 (58.1 ± 1.2)	1/04/84 (66.4 ± 1.6)	1/17/84 (67.4 ± 2.2)	1/17/84 (69.7 ± 2.2)
2nd RTI Analysis Day* PPB	58 (67.5 ± 2.0)	58 (60.5 ± 1.3)	58 (70.0 ± 1.7)	51 (64.8 ± 2.1)	51 (69.2 ± 2.2)
3rd RTI Analysis Day* PPB	240 (68.2 ± 2.0)	240 (64.6 ± 1.4)	240 (69.6 ± 1.7)	231 (71.1 ± 2.3)	231 (69.8 ± 2.2)
4th RTI Analysis Day* PPB	401 (65.2 ± 2.0)	401 (63.6 ± 1.3)	401 (71.7 ± 1.7)	377 (70.4 ± 2.3)	377 (68.5 ± 2.2)
5th RTI Analysis Day* PPB	497 (65.3 ± 2.0)	497 (62.7 ± 1.3)	497 (63.5 ± 1.5)	499 (69.1 ± 2.2)	499 (68.7 ± 2.2)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/04/84 (144 ± 4.3)	1/04/84 (114 ± 2.4)	1/04/84 (127 ± 3.0)	1/17/84 (135 ± 4.3)	1/17/84 (155 ± 5.0)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day PPB	58 (147 ± 4.4)	58 (116 ± 2.4)	58 (134 ± 3.2)	51 (17.0 ± 0.5)	51 (15.0 ± 0.5)
NBS Concentration** PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(17 ± 1)**	(15 ± 1)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C11

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	240 (146 ± 4.4)	240 (120 ± 2.5)	240 (131 ± 3.1)	231 (146 ± 4.7)	231 (152 ± 4.9)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day PPB	401 (142 ± 4.3)	401 (120 ± 2.5)	401 (127 ± 3.0)	377 (136 ± 4.4)	377 (150 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
5th RTI Analysis Day PPB	497 (141 ± 4.2)	497 (116 ± 2.4)	497 (129 ± 3.1)	499 (136 ± 4.4)	499 (149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C12

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(75.3)	(74.4)	(75.1)	(75.6)	(70.0)
1st Analysis Date	10/31/83	10/31/83	10/31/83	11/28/83	11/28/83
PPB	(73.4)	(73.5)	(74.1)	(71.0)	(70.1)
2nd Analysis Date	12/12/83	12/12/83	12/12/83	12/13/83	12/13/83
PPB	(72.1)	(74.2)	(73.6)	(76.4)	(68.9)
RTI ANALYSIS					
1st RTI Analysis Date	1/04/84	1/04/84	1/04/84	1/17/84	1/17/84
PPB	(76.0 ± 2.3)	(70.7 ± 1.5)	(80.7 ± 1.9)	(79.0 ± 2.5)	(72.9 ± 2.3)
2nd RTI Analysis Day*	58	58	58	51	51
PPB	(77.0 ± 2.3)	(71.8 ± 1.5)	(80.4 ± 1.9)	(76.6 ± 2.5)	(72.1 ± 2.3)
3rd RTI Analysis Day*	240	240	240	231	231
PPB	(79.1 ± 2.4)	(75.3 ± 1.6)	(81.7 ± 2.0)	(82.3 ± 2.6)	(73.4 ± 2.3)
4th RTI Analysis Day*	401	401	401	377	377
PPB	(74.5 ± 2.2)	(72.6 ± 1.5)	(80.7 ± 1.9)	(79.0 ± 2.5)	(71.3 ± 2.3)
5th RTI Analysis Day*	497	497	497	499	499
PPB	(74.0 ± 2.2)	(70.9 ± 1.5)	(73.3 ± 1.8)	(74.6 ± 2.4)	(70.4 ± 2.3)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/04/84	1/04/84	1/04/84	1/17/84	1/17/84
PPB	(144 ± 4.3)	(114 ± 2.4)	(127 ± 3.0)	(135 ± 4.3)	(155 ± 5.0)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
2nd RTI Analysis Day	58	58	58	51	51
PPB	(147 ± 4.4)	(116 ± 2.4)	(134 ± 3.2)	(17.0 ± 0.5)	(15.0 ± 0.5)
NBS Concentration** PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(17 ± 1)**	(15 ± 1)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C12

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	240 (146 ± 4.4)	240 (120 ± 2.5)	240 (131 ± 3.1)	231 (146 ± 4.7)	231 (152 ± 4.9)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
4th RTI Analysis Day PPB	401 (142 ± 4.3)	401 (120 ± 2.5)	401 (127 ± 3.0)	377 (136 ± 4.4)	377 (150 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)
5th RTI Analysis Day PPB	(141 ± 4.2)	(116 ± 2.4)	(129 ± 3.1)	(136 ± 4.4)	(149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C13

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(15.4)	(15.3)	(15.6)	(15.6)	(15.0)
1st Analysis Date	10/25/83	10/25/83	10/25/83	11/29/83	11/29/83
PPB	(12.4)	(13.6)	(12.7)	(10.8)	(13.6)
2nd Analysis Date	12/13/83	12/12/83	12/12/83	12/14/83	12/14/83
PPB	(11.5)	(11.9)	(11.6)	(11.3)	(14.3)
RTI ANALYSIS					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/23/84	1/23/84
PPB	(15.7 ± 0.5)	(14.6 ± 0.3)	(17.2 ± 0.4)	(16.2 ± 0.5)	(15.2 ± 0.5)
2nd RTI Analysis Day*	57	57	57	45	45
PPB	(16.2 ± 0.5)	(15.4 ± 0.3)	(17.2 ± 0.4)	(15.8 ± 0.5)	(16.1 ± 0.5)
3rd RTI Analysis Day	238	238	238	226	226
PPB	(15.7 ± 0.5)	(15.2 ± 0.3)	(15.7 ± 0.4)	(18.2 ± 0.6)	(15.4 ± 0.5)
4th RTI Analysis Day*	400	400	400	374	374
PPB	(15.2 ± 0.5)	(14.7 ± 0.3)	(16.0 ± 0.4)	(17.4 ± 0.6)	(14.4 ± 0.5)
5th RTI Analysis Day*	501	501	501	507	507
PPB	(15.4 ± 0.5)	(14.8 ± 0.3)	(15.9 ± 0.4)	(16.9 ± 0.5)	(15.4 ± 0.5)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/23/84	1/23/84
PPB	(20.4 ± 0.6)	(22.8 ± 0.5)	(30.7 ± 0.7)	(17.5 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	57	57	57	45	45
PPB	(147 ± 4.4)	(116 ± 2.4)	(134 ± 3.2)	(16.8 ± 0.5)	(15.1 ± 0.8)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C13

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
	RTI QUALITY CONTROL**				
3rd RTI Analysis Day	238	238	238	226	226
PPB	(20.3 ± 0.6)	(23.6 ± 0.5)	(28.3 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	400	400	400	374	374
PPB	(20.1 ± 0.6)	(22.7 ± 0.5)	(28.5 ± 0.7)	(18.4 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	501	501	501	507	507
PPB	(20.0 ± 0.6)	(22.8 ± 0.5)	(28.1 ± 0.7)	(18.2 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C14

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(19.6)	(19.4)	(19.9)	(19.8)	(15.0)
1st Analysis Date	10/25/83	10/25/83	10/25/83	11/29/83	11/29/83
PPB	(16.2)	(15.9)	(15.7)	(13.8)	(14.0)
2nd Analysis Date	12/13/83	12/13/83	12/13/83	12/14/83	12/14/83
PPB	(15.2)	(15.2)	(14.5)	(14.5)	(14.4)
RTI ANALYSIS					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/23/84	1/23/84
PPB	(19.2 ± 0.6)	(18.4 ± 0.4)	(21.1 ± 0.5)	(20.8 ± 0.7)	(15.5 ± 0.5)
2nd RTI Analysis Day*	57	57	57	45	45
PPB	(20.0 ± 0.6)	(18.5 ± 0.4)	(21.2 ± 0.5)	(20.2 ± 0.6)	(15.6 ± 0.5)
3rd RTI Analysis Day*	238	238	238	226	226
PPB	(19.9 ± 0.6)	(19.1 ± 0.4)	(20.2 ± 0.5)	(22.0 ± 0.7)	(17.0 ± 0.5)
4th RTI Analysis Day*	400	400	400	374	374
PPB	(19.3 ± 0.6)	(18.3 ± 0.4)	(20.7 ± 0.5)	(20.6 ± 0.7)	(15.0 ± 0.5)
5th RTI Analysis Day*	501	501	501	507	507
PPB	(19.6 ± 0.6)	(18.1 ± 0.4)	(20.3 ± 0.5)	(21.2 ± 0.7)	(16.1 ± 0.5)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/23/84	1/23/84
PPB	(20.4 ± 0.6)	(22.8 ± 0.5)	(30.7 ± 0.7)	(17.5 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	57	57	57	45	45
PPB	(147 ± 4.4)	(116 ± 2.4)	(134 ± 3.2)	(16.8 ± 0.5)	(15.1 ± 0.8)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C14

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	226	226
PPB	(20.3 ± 0.6)	(23.6 ± 0.5)	(28.3 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	400	400	400	374	374
PPB	(20.1 ± 0.6)	(22.7 ± 0.5)	(28.5 ± 0.7)	(18.4 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	501	501	501	507	507
PPB	(20.0 ± 0.6)	(22.8 ± 0.5)	(28.1 ± 0.7)	(18.2 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C15

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(18.1)	(17.9)	(18.3)	(18.3)	(15.0)
1st Analysis Date PPB	10/25/83 (14.0)	10/25/83 (14.3)	10/25/83 (13.8)	11/29/83 (11.9)	11/29/83 (13.8)
2nd Analysis Date PPB	12/13/83 (12.9)	12/13/83 (13.0)	12/13/83 (12.6)	12/14/83 (12.7)	12/14/83 (14.2)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/05/84 (17.2 ± 0.5)	1/05/84 (16.2 ± 0.3)	1/05/84 (19.3 ± 0.5)	1/23/84 (18.1 ± 0.6)	1/23/84 (14.9 ± 0.5)
2nd RTI Analysis Day* PPB	57 (17.2 ± 0.5)	57 (16.7 ± 0.4)	57 (19.4 ± 0.5)	45 (17.5 ± 0.6)	45 (14.8 ± 0.5)
3rd RTI Analysis Day* PPB	238 (17.6 ± 0.5)	238 (17.0 ± 0.4)	238 (17.9 ± 0.4)	226 (19.8 ± 0.6)	226 (15.6 ± 0.5)
4th RTI Analysis Day* PPB	400 (17.0 ± 0.5)	400 (16.4 ± 0.3)	400 (18.3 ± 0.4)	374 (18.8 ± 0.6)	374 (14.9 ± 0.5)
5th RTI Analysis Day* PPB	501 (15.9 ± 0.5)	501 (16.4 ± 0.3)	501 (17.4 ± 0.4)	507 (18.6 ± 0.6)	507 (15.4 ± 0.5)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/05/84 (20.4 ± 0.6)	1/05/84 (22.8 ± 0.5)	1/05/84 (30.7 ± 0.7)	1/23/84 (17.5 ± 0.6)	1/23/84 (14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day PPB	57 (147 ± 4.4)	57 (116 ± 2.4)	57 (134 ± 3.2)	45 (16.8 ± 0.5)	45 (15.1 ± 0.8)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C15

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	226	226
PPB	(20.3 ± 0.6)	(23.6 ± 0.5)	(28.3 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	400	400	400	374	374
PPB	(20.1 ± 0.6)	(22.7 ± 0.5)	(28.5 ± 0.7)	(18.4 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	501	501	501	507	507
PPB	(20.0 ± 0.6)	(22.8 ± 0.5)	(28.1 ± 0.7)	(18.2 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-C16

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(20.9)	(20.7)	(21.2)	(21.2)	(15.0)
1st Analysis Date PPB	11/11/83 (15.6)	11/11/83 (11.1)	11/11/83 (12.5)	11/29/83 (9.1)	11/29/83 (13.9)
2nd Analysis Date PPB	12/13/83 (14.2)	12/13/83 (8.1)	12/13/83 (11.7)	12/14/83 (9.4)	12/14/83 (13.8)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/05/84 (17.9 ± 0.5)	1/05/84 (9.0 ± 0.2)	1/05/84 (16.5 ± 0.4)	1/23/84 (13.8 ± 0.4)	1/23/84 (14.9 ± 0.5)
2nd RTI Analysis Day* PPB	57 (17.4 ± 0.5)	57 (7.9 ± 0.2)	57 (15.4 ± 0.4)	45 (13.2 ± 0.4)	45 (14.8 ± 0.5)
3rd RTI Analysis Day* PPB	238 (16.2 ± 0.5)	238 (6.0 ± 0.1)	238 (14.6 ± 0.4)	226 (14.6 ± 0.5)	226 (15.8 ± 0.5)
4th RTI Analysis Day* PPB	400 (14.9 ± 0.4)	400 (4.8 ± 0.1)	400 (14.6 ± 0.4)	374 (13.6 ± 0.4)	374 (12.3 ± 0.4)
5th RTI Analysis Day* PPB	501 (14.5 ± 0.4)	501 (3.7 ± 0.1)	501 (14.2 ± 0.3)	507 (12.2 ± 0.4)	507 (11.6 ± 0.4)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/05/84 (20.4 ± 0.6)	1/05/84 (22.8 ± 0.5)	1/05/84 (30.7 ± 0.7)	1/23/84 (17.5 ± 0.6)	1/23/84 (14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day PPB	57 (147 ± 4.4)	57 (116 ± 2.4)	57 (134 ± 3.2)	45 (16.8 ± 0.5)	45 (15.1 ± 0.8)
NBS Concentration** PPB	(141 ± 3)**	(120 ± 3)**	(126 ± 3)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-C16

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	226	226
PPB	(20.3 ± 0.6)	(23.6 ± 0.5)	(28.3 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 1)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	400	400	400	374	374
PPB	(20.1 ± 0.6)	(22.7 ± 0.5)	(28.5 ± 0.7)	(18.4 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	501	501	501	507	507
PPB	(20.0 ± 0.6)	(22.8 ± 0.5)	(28.1 ± 0.7)	(18.2 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A1

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(9.7)	(40.5)	(9.6)	(19.3)	(20.0)
1st Analysis Date	11/16/83	11/16/83	11/16/83	12/06/83	12/06/83
PPB	(8.3)	(42.9)	(10.2)	(16.0)	(18.8)
2nd Analysis Date	12/16/83	12/16/83	12/16/83	12/15/83	12/15/83
PPB	(7.3)	(41.6)	(7.3)	(16.8)	(19.2)
RTI ANALYSIS					
1st RTI Analysis Date	1/06/84	1/06/84	1/06/84	1/23/84	1/23/84
PPB	(9.8 ± 0.3)	(40.4 ± 0.8)	(10.8 ± 0.3)	(19.6 ± 0.6)	(20.3 ± 0.6)
2nd RTI Analysis Day*	59	59	59	49	49
PPB	(9.9 ± 0.3)	(42.0 ± 0.9)	(9.6 ± 0.2)	(20.0 ± 0.6)	(19.8 ± 0.6)
3rd RTI Analysis Day*					
PPB	on audit	on audit	on audit	on audit	on audit
4th RTI Analysis Day*	404	404	404	375	375
PPB	(9.9 ± 0.3)	(37.6 ± 0.8)	(9.1 ± 0.2)	(19.4 ± 0.6)	(20.2 ± 0.6)
5th RTI Analysis Day*	497	497	497	508	508
PPB	(9.5 ± 0.3)	(37.3 ± 0.8)	(10.0 ± 0.2)	(19.7 ± 0.6)	(20.6 ± 0.7)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/06/84	1/06/84	1/06/84	1/23/84	1/23/84
PPB	(20.6 ± 0.6)	(22.8 ± 0.5)	(31.7 ± 0.8)	(17.5 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	59	59	59	49	49
PPB	(20.3 ± 0.6)	(8.9 ± 0.2)	(23.6 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A1

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	226	226
PPB	(21.1 ± 0.6)	(24.3 ± 0.5)	(29.5 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	404	404	404	375	375
PPB	(20.6 ± 0.6)	(23.2 ± 0.5)	(28.7 ± 0.7)	(18.1 ± 0.6)	(14.1 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	497	497	497	508	508
PPB	(19.9 ± 0.6)	(22.9 ± 0.5)	(28.8 ± 0.7)	(18.5 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A2

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(9.5)	(39.6)	(9.4)	(18.9)	(20.0)
1st Analysis Date	11/17/83	11/17/83	11/17/83	12/06/83	12/06/83
PPB	(7.7)	(42.1)	(9.2)	(15.8)	(18.3)
2nd Analysis Date	12/16/83	12/16/83	12/16/83	12/15/83	12/15/83
PPB	(7.1)	(41.2)	(7.7)	(19.6)	(19.2)
RTI ANALYSIS					
1st RTI Analysis Date	1/06/84	1/06/84	1/06/84	1/23/84	1/23/84
PPB	(9.3 ± 0.3)	(40.0 ± 0.8)	(9.4 ± 0.2)	(19.6 ± 0.6)	(20.2 ± 0.6)
2nd RTI Analysis Day*	59	59	59	49	49
PPB	(9.3 ± 0.3)	(38.7 ± 0.8)	(10.3 ± 0.2)	(20.0 ± 0.6)	(19.0 ± 0.6)
3rd RTI Analysis Day*	238	238	238	226	226
PPB	(9.5 ± 0.3)	(40.6 ± 0.9)	(9.5 ± 0.2)	(19.4 ± 0.6)	(20.6 ± 0.7)
4th RTI Analysis Day*	404	404	404	375	375
PPB	(9.6 ± 0.3)	(37.1 ± 0.8)	(9.1 ± 0.2)	(19.4 ± 0.6)	(20.4 ± 0.7)
5th RTI Analysis Day*					
PPB	on audit	on audit	on audit	on audit	on audit
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/06/84	1/06/84	1/06/84	1/23/84	1/23/84
PPB	(20.6 ± 0.6)	(22.8 ± 0.5)	(31.7 ± 0.8)	(17.5 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	59	59	59	49	49
PPB	(20.3 ± 0.6)	(8.9 ± 0.2)	(23.6 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A2

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	226	226
PPB	(21.1 ± 0.6)	(24.3 ± 0.5)	(29.5 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	404	404	404	375	375
PPB	(20.6 ± 0.6)	(23.2 ± 0.5)	(28.7 ± 0.7)	(18.1 ± 0.6)	(14.1 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	497	497	497	508	508
PPB	(19.9 ± 0.6)	(22.9 ± 0.5)	(28.8 ± 0.7)	(18.5 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A3

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(11.4)	(47.3)	(11.2)	(22.5)	(20.0)
1st Analysis Date	12/09/83	12/09/83	12/09/83	12/07/83	12/07/83
PPB	(9.5)	(47.2)	(9.4)	(18.7)	(15.8)
2nd Analysis Date	12/16/83	12/16/83	12/16/83	12/15/83	12/15/83
PPB	(8.9)	(48.7)	(8.6)	(20.3)	(19.4)
RTI ANALYSIS					
1st RTI Analysis Date	1/06/84	1/06/84	1/06/84	1/23/84	1/23/84
PPB	(11.5 ± 0.3)	(46.6 ± 1.0)	(12.0 ± 0.3)	(23.2 ± 0.7)	(20.3 ± 0.6)
2nd RTI Analysis Day*	59	59	59	49	49
PPB	(11.0 ± 0.3)	(47.4 ± 1.0)	(11.3 ± 0.3)	(25.2 ± 0.8)	(19.8 ± 0.6)
3rd RTI Analysis Day*					
PPB	on audit	on audit	on audit	on audit	on audit
4th RTI Analysis Day*	404	404	404	375	375
PPB	(11.4 ± 0.3)	(43.9 ± 0.9)	(10.3 ± 0.2)	(23.0 ± 0.7)	(20.5 ± 0.7)
5th RTI Analysis Day*	497	497	497		
PPB	(11.0 ± 0.3)	(43.6 ± 0.9)	(11.6 ± 0.3)	on audit	on audit
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/06/84	1/06/84	1/06/84	1/23/84	1/23/84
PPB	(20.6 ± 0.6)	(22.8 ± 0.5)	(31.7 ± 0.8)	(17.5 ± 0.6)	(14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	59	59	59	49	49
PPB	(20.3 ± 0.6)	(8.9 ± 0.2)	(23.6 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A3

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	226	226
PPB	(21.1 ± 0.6)	(24.3 ± 0.5)	(29.5 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	404	404	404	375	375
PPB	(20.6 ± 0.6)	(23.2 ± 0.5)	(28.7 ± 0.7)	(18.1 ± 0.6)	(14.1 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	497	497	497	508	508
PPB	(19.9 ± 0.6)	(22.9 ± 0.5)	(28.8 ± 0.7)	(18.5 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A4

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(10.9)	(45.3)	(10.8)	(21.5)	(20.0)
1st Analysis Date PPB	12/09/83 (9.0)	12/09/83 (46.5)	12/09/83 (9.6)	12/07/83 (18.6)	12/07/83 (18.3)
2nd Analysis Date PPB	12/16/83 (8.6)	12/16/83 (51.1)	12/16/83 (10.1)	12/15/83 (19.5)	12/15/83 (19.2)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/09/84 (11.0 ± 0.3)	1/09/84 (45.0 ± 0.9)	1/09/84 (12.0 ± 0.3)	1/23/84 (22.3 ± 0.7)	1/23/84 (20.5 ± 0.7)
2nd RTI Analysis Day* PPB	59 on audit	59 on audit	59 on audit	59 on audit	59 on audit
3rd RTI Analysis Day* PPB	238 (10.8 ± 0.3)	238 (47.1 ± 1.0)	238 (10.3 ± 0.2)	226 (23.2 ± 0.7)	226 (20.1 ± 0.6)
4th RTI Analysis Day* PPB	404 (11.4 ± 0.3)	404 (43.9 ± 0.9)	404 (10.3 ± 0.2)	375 (19.9 ± 0.6)	375 (22.1 ± 0.7)
5th RTI Analysis Day* PPB	on audit	on audit	on audit	508 (22.3 ± 0.7)	508 (19.8 ± 0.6)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/06/84 (20.6 ± 0.6)	1/06/84 (22.8 ± 0.5)	1/06/84 (31.7 ± 0.8)	1/23/84 (17.5 ± 0.6)	1/23/84 (14.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day PPB	59 (20.3 ± 0.6)	59 (8.9 ± 0.2)	59 (23.6 ± 0.6)	49 (18.6 ± 0.6)	49 (15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A4

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	226	226
PPB	(21.1 ± 0.6)	(24.3 ± 0.5)	(29.5 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	404	404	404	375	375
PPB	(20.6 ± 0.6)	(23.2 ± 0.5)	(28.7 ± 0.7)	(18.1 ± 0.6)	(14.1 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	497	497	497	508	508
PPB	(19.9 ± 0.6)	(22.9 ± 0.5)	(28.8 ± 0.7)	(18.5 ± 0.6)	(15.2 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A5

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(48.4)	(10.6)	(10.6)	(48.4)	(50.0)
1st Analysis Date	12/09/83	12/09/83	12/09/83	12/07/83	12/07/83
PPB	(46.6)	(9.7)	(9.5)	(45.1)	(47.5)
2nd Analysis Date	12/20/83	12/20/83	12/20/83	12/15/83	12/15/83
PPB	(47.8)	(9.0)	(8.7)	(46.0)	(49.8)
RTI ANALYSIS					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(47.7 ± 1.4)	(10.5 ± 0.2)	(11.2 ± 0.3)	(51.6 ± 1.7)	(53.0 ± 1.7)
2nd RTI Analysis Day*	57	57	57	53	53
PPB	(51.1 ± 1.5)	(9.3 ± 0.2)	(9.0 ± 0.2)	(52.0 ± 1.7)	(50.0 ± 1.6)
3rd RTI Analysis Day*	235	235	235	229	229
PPB	(50.9 ± 1.5)	(10.5 ± 0.2)	(10.5 ± 0.3)	(54.0 ± 1.7)	(52.8 ± 1.7)
4th RTI Analysis Day*	402	402	402	375	375
PPB	(47.2 ± 1.4)	(10.2 ± 0.2)	(10.4 ± 0.2)	(53.8 ± 1.7)	(50.8 ± 1.6)
5th RTI Analysis Day*	494	494	494	497	497
PPB	(46.0 ± 1.4)	(10.3 ± 0.2)	(10.7 ± 0.3)	(49.0 ± 1.6)	(50.1 ± 1.6)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(18.9 ± 0.6)	(9.4 ± 0.2)	(24.4 ± 0.6)	(20.2 ± 0.6)	(16.3 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	57	57	57	53	53
PPB	(21.5 ± 0.6)	(10.1 ± 0.2)	(26.1 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A5

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	235	235	235	229	229
PPB	(21.1 ± 0.6)	(24.3 ± 0.5)	(29.5 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration** PPB	(21 ± 1)**	(23 ± 1)**	(29 ± 2)**	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	402	402	402	375	375
PPB	(18.9 ± 0.6)	(9.2 ± 0.2)	(21.9 ± 0.5)	(17.8 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	494	494	494	497	497
PPB	(19.9 ± 0.6)	(22.9 ± 0.5)	(28.8 ± 0.7)	(18.5 ± 0.6)	(29.4 ± 0.9)
NBS Concentration** PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(18 ± 1)	(31 ± 2)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 3rd and 5th RTI analysis than on the 1st, 2nd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A6

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical					
PPB	(38.8)	(8.5)	(8.5)	(38.8)	(50.0)
1st Analysis Date	12/09/83	12/09/83	12/09/83	12/07/83	12/07/83
PPB	(38.0)	(6.9)	(8.8)	(35.0)	(47.1)
2nd Analysis Date	12/20/83	12/20/83	12/20/83	12/15/83	12/15/83
PPB	(37.5)	(6.7)	(8.1)	(34.5)	(49.3)
RTI ANALYSIS					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(38.6 ± 1.2)	(8.2 ± 0.2)	(8.5 ± 0.2)	(41.9 ± 1.3)	(53.0 ± 1.7)
2nd RTI Analysis Day*	57	57	57	53	53
PPB	(41.0 ± 1.2)	(7.3 ± 0.2)	(7.9 ± 0.2)	(41.1 ± 1.3)	(49.8 ± 1.6)
3rd RTI Analysis Day*	235	235	235	229	229
PPB	(40.4 ± 1.2)	(8.2 ± 0.2)	(8.2 ± 0.2)	(43.1 ± 1.4)	(51.9 ± 1.7)
4th RTI Analysis Day*	402	402	402	375	375
PPB	(37.7 ± 1.1)	(8.3 ± 0.2)	(8.4 ± 0.2)	(40.7 ± 1.3)	(50.8 ± 1.6)
5th RTI Analysis Day*	494	494	494	497	497
PPB	(37.2 ± 1.1)	(8.1 ± 0.2)	(9.0 ± 0.2)	(39.1 ± 1.3)	(50.3 ± 1.6)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(18.9 ± 0.6)	(9.4 ± 0.2)	(24.4 ± 0.6)	(20.2 ± 0.6)	(16.3 ± 0.5)
NBS Concentration					
PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	57	57	57	53	53
PPB	(21.5 ± 0.6)	(10.1 ± 0.2)	(26.1 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration					
PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A6

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	235	235	235	229	229
PPB	(21.1 ± 0.6)	(24.3 ± 0.5)	(29.5 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration** PPB	(21 ± 1)**	(23 ± 1)**	(29 ± 2)**	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	402	402	402	375	375
PPB	(18.9 ± 0.6)	(9.2 ± 0.2)	(21.9 ± 0.5)	(17.8 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	494	494	494	497	497
PPB	(19.9 ± 0.6)	(22.9 ± 0.5)	(28.8 ± 0.7)	(18.5 ± 0.6)	(29.4 ± 0.9)
NBS Concentration** PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(18 ± 1)	(31 ± 2)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 3rd and 5th RTI analysis than on the 1st, 2nd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A7

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical					
PPB	(51.1)	(11.2)	(11.2)	(51.1)	(50.0)
1st Analysis Date	12/09/83	12/09/83	12/09/83	12/07/83	12/07/83
PPB	(49.2)	(10.4)	(10.4)	(47.1)	(48.6)
2nd Analysis Date	12/20/83	12/20/83	12/20/83	12/15/83	12/15/83
PPB	(49.9)	(9.5)	(9.3)	(48.5)	(48.5)
RTI ANALYSIS					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(49.2 ± 1.5)	(11.1 ± 0.2)	(11.8 ± 0.3)	(54.1 ± 1.7)	(53.4 ± 1.7)
2nd RTI Analysis Day*	57	57	57	53	53
PPB	(54.0 ± 1.6)	(9.7 ± 0.2)	(9.7 ± 0.2)	(54.8 ± 1.8)	(49.7 ± 1.6)
3rd RTI Analysis Day*	235	235	235	229	229
PPB	(53.3 ± 1.6)	(11.0 ± 0.2)	(11.2 ± 0.3)	(56.2 ± 1.8)	(51.9 ± 1.7)
4th RTI Analysis Day*	402	402	402	375	375
PPB	(49.6 ± 1.5)	(10.7 ± 0.2)	(11.1 ± 0.3)	(53.8 ± 1.7)	(50.8 ± 1.6)
5th RTI Analysis Day*	494	494	494	497	497
PPB	(47.8 ± 1.5)	(10.8 ± 0.2)	(11.7 ± 0.3)	(52.3 ± 1.7)	(50.4 ± 1.6)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(18.9 ± 0.6)	(9.4 ± 0.2)	(24.4 ± 0.6)	(20.2 ± 0.6)	(16.3 ± 0.5)
NBS Concentration					
PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	57	57	57	53	53
PPB	(21.5 ± 0.6)	(10.1 ± 0.2)	(26.1 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration					
PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A7

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	235 (21.1 ± 0.6)	235 (24.3 ± 0.5)	235 (29.5 ± 0.7)	229 (19.0 ± 0.6)	229 (15.3 ± 0.5)
NBS Concentration** PPB	(21 ± 1)**	(23 ± 1)**	(29 ± 2)**	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day PPB	402 (18.9 ± 0.6)	402 (9.2 ± 0.2)	402 (21.9 ± 0.5)	375 (17.8 ± 0.6)	375 (14.8 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day PPB	494 (19.9 ± 0.6)	494 (22.9 ± 0.5)	494 (28.8 ± 0.7)	497 (18.5 ± 0.6)	497 (29.4 ± 0.9)
NBS Concentration** PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(18 ± 1)	(31 ± 2)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 3rd and 5th RTI analysis than on the 1st, 2nd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A8

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(55.1)	(12.1)	(12.1)	(55.1)	---
1st Analysis Date	12/09/83	12/09/83	12/09/83	12/07/83	12/07/83
PPB	(52.6)	(7.9)	(10.5)	(42.7)	(48.4)
2nd Analysis Date	12/20/83	12/20/83	12/20/83	12/15/83	12/15/83
PPB	(53.2)	(6.3)	(9.5)	(43.9)	(48.3)
RTI ANALYSIS					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(53.5 ± 2.7)	(7.4 ± 0.2)	(11.3 ± 0.3)	(48.3 ± 1.5)	(51.7 ± 1.7)
2nd RTI Analysis Day*	57	57	57	53	53
PPB	(59.0 ± 1.8)	(6.0 ± 0.1)	(10.5 ± 0.3)	(48.1 ± 1.5)	(49.2 ± 1.6)
3rd RTI Analysis Day*					
PPB	on audit	on audit	on audit	on audit	on audit
4th RTI Analysis Day*	402	402	402	375	375
PPB	(51.3 ± 1.5)	(4.3 ± 0.1)	(10.3 ± 0.2)	(46.3 ± 1.5)	(49.0 ± 1.6)
5th RTI Analysis Day*	494	494	494	497	497
PPB	(50.1 ± 1.5)	(4.1 ± 0.1)	(11.4 ± 0.3)	(44.2 ± 1.4)	(48.5 ± 1.6)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/19/84	1/19/84
PPB	(18.9 ± 0.6)	(9.4 ± 0.2)	(24.4 ± 0.6)	(20.2 ± 0.6)	(16.3 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	57	57	57	53	53
PPB	(21.5 ± 0.6)	(10.1 ± 0.2)	(26.1 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A8

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	235	235	235	229	229
PPB	(21.1 ± 0.6)	(24.3 ± 0.5)	(29.5 ± 0.7)	(19.0 ± 0.6)	(15.3 ± 0.5)
NBS Concentration** PPB	(21 ± 1)**	(23 ± 1)**	(29 ± 2)**	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	402	402	402	375	375
PPB	(18.9 ± 0.6)	(9.2 ± 0.2)	(21.9 ± 0.5)	(17.8 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	494	494	494	497	497
PPB	(19.9 ± 0.6)	(22.9 ± 0.5)	(28.8 ± 0.7)	(18.5 ± 0.6)	(29.4 ± 0.9)
NBS Concentration** PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(18 ± 1)	(31 ± 2)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 3rd and 5th RTI analysis than on the 1st, 2nd and 4th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A9

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(13.6)	(13.4)	(68.4)	(48.3)	(30.0)
1st Analysis Date PPB	12/08/83 (11.1)	12/08/83 (11.3)	12/08/83 (63.5)	12/09/83 (41.8)	12/09/83 (29.0)
2nd Analysis Date PPB	12/19/83 (11.8)	12/19/83 (11.4)	12/19/83 (63.8)	12/16/83 (43.9)	12/16/83 (28.5)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/05/84 (13.0 ± 2.7)	1/05/84 (11.9 ± 0.2)	1/05/84 (69.6 ± 1.7)	1/20/84 (46.8 ± 1.5)	1/20/84 (31.1 ± 1.0)
2nd RTI Analysis Day* PPB	60 (11.8 ± 0.4)	60 (10.5 ± 0.2)	60 (67.6 ± 1.6)	52 (46.4 ± 1.5)	52 (29.3 ± 0.9)
3rd RTI Analysis Day* PPB	238 (12.7 ± 0.4)	238 (12.3 ± 0.3)	238 (62.2 ± 1.5)	228 (48.0 ± 1.5)	228 (31.3 ± 1.0)
4th RTI Analysis Day* PPB	407 (12.5 ± 0.4)	407 (11.8 ± 0.2)	407 (63.7 ± 1.5)	374 (45.8 ± 1.5)	374 (29.9 ± 1.0)
5th RTI Analysis Day* PPB	(12.0 ± 0.4)	(12.0 ± 0.3)	(64.3 ± 1.5)	(44.7 ± 1.4)	(29.0 ± 0.9)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/05/84 (20.4 ± 0.6)	1/05/84 (22.8 ± 0.5)	1/05/84 (30.7 ± 0.7)	1/20/84 (18.4 ± 0.6)	1/20/84 (14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day PPB	60 (20.3 ± 0.6)	60 (8.9 ± 0.2)	60 (23.6 ± 0.6)	52 (18.6 ± 0.6)	52 (15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A9

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	228	228
PPB	(20.3 ± 0.6)	(23.6 ± 0.5)	(28.3 ± 0.7)	(19.0 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	407	407	407	374	374
PPB	(20.7 ± 0.6)	(23.3 ± 0.5)	(29.0 ± 0.7)	(17.8 ± 0.6)	(14.8 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	496	496	496	504	504
PPB	(20.3 ± 0.6)	(23.4 ± 0.5)	(30.6 ± 0.7)	(18.6 ± 0.6)	(14.7 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd and 4th RTI analysis than on the 1st, 3rd and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A10

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(13.3)	(13.1)	(67.0)	(47.3)	(30.0)
1st Analysis Date PPB	12/08/83 (11.1)	12/08/83 (11.8)	12/08/83 (75.1)	12/09/83 (41.0)	12/09/83 (28.9)
2nd Analysis Date PPB	12/19/83 (11.8)	12/19/83 (11.1)	12/19/83 (64.1)	12/16/83 (43.3)	12/16/83 (28.3)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/05/84 (12.6 ± 2.7)	1/05/84 (11.6 ± 0.2)	1/05/84 (68.6 ± 1.6)	1/20/84 (46.1 ± 1.5)	1/20/84 (31.6 ± 1.0)
2nd RTI Analysis Day* PPB	60 (11.6 ± 0.3)	60 (10.2 ± 0.2)	60 (67.7 ± 1.6)	52 (45.2 ± 1.4)	52 (29.8 ± 1.0)
3rd RTI Analysis Day* PPB	238 (12.5 ± 0.4)	238 (12.2 ± 0.3)	238 (62.2 ± 1.5)	228 (47.3 ± 1.5)	228 (32.0 ± 1.0)
4th RTI Analysis Day* PPB	407 (12.5 ± 0.4)	407 (11.7 ± 0.2)	407 (62.1 ± 1.5)	374 (45.4 ± 1.5)	374 (30.4 ± 1.0)
5th RTI Analysis Day* PPB	496 (12.3 ± 0.4)	496 (12.2 ± 0.3)	496 (65.1 ± 1.6)	504 (43.9 ± 1.4)	504 (29.9 ± 1.0)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/05/84 (20.4 ± 0.6)	1/05/84 (22.8 ± 0.5)	1/05/84 (30.7 ± 0.7)	1/20/84 (18.4 ± 0.6)	1/20/84 (14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day PPB	60 (20.3 ± 0.6)	60 (8.9 ± 0.2)	60 (23.6 ± 0.6)	52 (18.6 ± 0.6)	52 (15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A10

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	238 (20.3 ± 0.6)	238 (23.6 ± 0.5)	238 (28.3 ± 0.7)	228 (19.0 ± 0.6)	228 (14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day PPB	407 (20.7 ± 0.6)	407 (23.6 ± 0.5)	407 (28.3 ± 0.7)	374 (19.0 ± 0.6)	374 (14.8 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day PPB	496 (20.3 ± 0.6)	496 (23.4 ± 0.5)	496 (30.6 ± 0.7)	504 (18.6 ± 0.6)	504 (14.7 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd and 4th RTI analysis than on the 1st, 3rd and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A11

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(11.7)	(11.5)	(59.0)	(41.6)	(30.0)
1st Analysis Date	12/08/83	12/08/83	12/08/83	12/09/83	12/09/83
PPB	(5.7)	(7.3)	(25.9)	(22.1)	(28.5)
2nd Analysis Date	12/19/83	12/19/83	12/19/83	12/16/83	12/16/83
PPB	(6.7)	(6.2)	(20.6)	(23.2)	(28.6)
RTI ANALYSIS					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/20/84	1/20/84
PPB	(7.8 ± 2.7)	(7.8 ± 0.2)	(22.8 ± 0.5)	(26.2 ± 0.8)	(31.4 ± 1.0)
2nd RTI Analysis Day*	60	60	60	52	52
PPB	(6.6 ± 0.2)	(7.4 ± 0.2)	(21.9 ± 0.5)	(26.0 ± 0.8)	(29.6 ± 0.9)
3rd RTI Analysis Day*	238	238	238	228	228
PPB	(7.1 ± 0.2)	(8.1 ± 0.2)	(21.1 ± 0.5)	(29.9 ± 1.0)	(32.0 ± 1.0)
4th RTI Analysis Day*	407	407	407	374	374
PPB	(7.0 ± 0.2)	(7.8 ± 0.2)	(21.5 ± 0.5)	(29.8 ± 1.0)	(32.0 ± 1.0)
5th RTI Analysis Day*	496	496	496	504	504
PPB	(6.4 ± 0.2)	(7.9 ± 0.2)	(21.1 ± 0.5)	(25.9 ± 0.8)	(30.1 ± 1.0)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/20/84	1/20/84
PPB	(20.4 ± 0.6)	(22.8 ± 0.5)	(30.7 ± 0.7)	(18.4 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	60	60	60	52	52
PPB	(20.3 ± 0.6)	(8.9 ± 0.2)	(23.6 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A11

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	238	238	238	228	228
PPB	(20.3 ± 0.6)	(23.6 ± 0.5)	(28.3 ± 0.7)	(19.0 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day	407	407	407	374	374
PPB	(20.7 ± 0.6)	(23.3 ± 0.5)	(29.0 ± 0.7)	(17.8 ± 0.6)	(14.8 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day	496	496	496	504	504
PPB	(20.0 ± 0.6)	(22.8 ± 0.5)	(28.1 ± 0.7)	(18.6 ± 0.6)	(14.7 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd and 4th RTI analysis than on the 1st, 3rd and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A12

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(14.3)	(14.0)	(71.8)	(50.7)	(30.0)
1st Analysis Date	12/08/83	12/08/83	12/08/83	12/09/83	12/09/83
PPB	(12.7)	(13.2)	(70.9)	(46.5)	(28.1)
2nd Analysis Date	12/19/83	12/19/83	12/19/83	12/16/83	12/16/83
PPB	(12.6)	(12.9)	(68.3)	(48.9)	(28.5)
RTI ANALYSIS					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/20/84	1/20/84
PPB	(14.2 ± 2.7)	(13.0 ± 0.3)	(74.3 ± 1.8)	(51.9 ± 1.7)	(31.1 ± 1.0)
2nd RTI Analysis Day*	60	60	60	52	52
PPB	(13.4 ± 0.4)	(12.4 ± 0.3)	(75.6 ± 1.8)	(51.2 ± 1.6)	(29.6 ± 0.9)
3rd RTI Analysis Day* PPB	on audit	on audit	on audit	on audit	on audit
4th RTI Analysis Day* PPB	on audit	on audit	on audit	on audit	on audit
5th RTI Analysis Day* PPB	on audit	on audit	on audit	on audit	on audit
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/05/84	1/05/84	1/05/84	1/20/84	1/20/84
PPB	(20.4 ± 0.6)	(22.8 ± 0.5)	(30.7 ± 0.7)	(18.4 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	60	60	60	52	52
PPB	(20.3 ± 0.6)	(8.9 ± 0.2)	(23.6 ± 0.6)	(18.6 ± 0.6)	(15.0 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A12

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	238 (20.3 ± 0.6)	238 (23.6 ± 0.5)	238 (28.3 ± 0.7)	228 (19.0 ± 0.6)	228 (14.8 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)
4th RTI Analysis Day PPB	407 (20.7 ± 0.6)	407 (23.3 ± 0.5)	407 (29.0 ± 0.7)	374 (17.8 ± 0.6)	374 (14.8 ± 0.5)
NBS Concentration** PPB	(19 ± 1)**	(9 ± 1)**	(22 ± 1)**	(17 ± 1)	(15 ± 1)
5th RTI Analysis Day PPB	496 (20.0 ± 0.6)	496 (22.8 ± 0.5)	496 (28.1 ± 0.7)	504 (18.6 ± 0.6)	504 (14.7 ± 0.5)
NBS Concentration PPB	(21 ± 1)	(23 ± 1)	(29 ± 2)	(17 ± 1)	(15 ± 1)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd and 4th RTI analysis than on the 1st, 3rd and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A13

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(89.0)	(353)	(313)	(134)	(150)
1st Analysis Date	12/07/83	12/07/83	12/07/83	12/08/83	12/08/83
PPB	(83.3)	(369)	(297)	(133)	(136)
2nd Analysis Date	12/15/83	12/15/83	12/15/83	12/19/83	12/19/83
PPB	(81.0)	(371)	(315)	(139)	(145)
RTI ANALYSIS					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/20/84	1/20/84
PPB	(91.6 ± 2.7)	(351 ± 7.4)	(332 ± 8.0)	(140 ± 4.5)	(156 ± 5.0)
2nd RTI Analysis Day*	57	57	57	54	54
PPB	(97.0 ± 2.9)	(354 ± 7.4)	(359 ± 8.6)	(139 ± 4.4)	(152 ± 4.9)
3rd RTI Analysis Day*	231	231	231	225	225
PPB	(94.7 ± 2.8)	(334 ± 7.0)	(323 ± 7.8)	(145 ± 4.6)	(153 ± 4.9)
4th RTI Analysis Day*	395	395	395	370	370
PPB	(86.7 ± 2.6)	(325 ± 6.8)	(322 ± 7.7)	(138 ± 4.4)	(153 ± 4.9)
5th RTI Analysis Day*	491	491	491	497	497
PPB	(86.2 ± 2.6)	(331 ± 7.0)	(313 ± 7.5)	(138 ± 4.4)	(146 ± 4.7)
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/20/84	1/20/84
PPB	(18.9 ± 0.6)	(9.4 ± 0.2)	(24.4 ± 0.6)	(18.4 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day	57	57	57	54	54
PPB	(21.5 ± 0.6)	(10.1 ± 0.2)	(26.1 ± 0.6)	(192 ± 6.1)	(192 ± 6.1)
NBS Concentration** PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(192 ± 4)**	(192 ± 4)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A13

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day PPB	231 (155 ± 4.7)	231 (132 ± 2.8)	231 (147 ± 3.5)	225 (191 ± 6.1)	225 (191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day PPB	395 (154 ± 4.6)	395 (135 ± 2.8)	395 (145 ± 3.5)	370 (200 ± 6.4)	370 (195 ± 6.2)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day PPB	491 (142 ± 4.3)	491 (115 ± 2.4)	491 (126 ± 3.0)	497 (139 ± 4.4)	497 (149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A14

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(91.5)	(362)	(321)	(138)	(150)
1st Analysis Date PPB	12/07/83 (81.6)	12/07/83 (373)	12/07/83 (301)	12/08/83 (130)	12/08/83 (137)
2nd Analysis Date PPB	12/15/83 (78.3)	12/15/83 (367)	12/15/83 (312)	12/19/83 (135)	12/19/83 (145)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/09/84 (90.5 ± 2.7)	1/09/84 (339 ± 7.1)	1/09/84 (324 ± 7.8)	1/20/84 (138 ± 4.4)	1/20/84 (154 ± 4.9)
2nd RTI Analysis Day* PPB	57 (90.6 ± 2.7)	57 (345 ± 7.2)	57 (342 ± 8.2)	54 (135 ± 4.3)	54 (151 ± 4.8)
3rd RTI Analysis Day* PPB	231 (92.3 ± 2.8)	231 (326 ± 6.8)	231 (317 ± 7.6)	225 (140 ± 4.5)	225 (153 ± 4.9)
4th RTI Analysis Day* PPB	395 (85.7 ± 2.6)	395 (335 ± 7.0)	395 (322 ± 7.7)	371 (137 ± 4.4)	371 (152 ± 4.9)
5th RTI Analysis Day* PPB	(86.2 ± 2.6)	(331 ± 7.0)	(307 ± 7.4)	(137 ± 4.4)	(150 ± 4.8)
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/09/84 (18.9 ± 0.6)	1/09/84 (9.4 ± 0.2)	1/09/84 (24.4 ± 0.6)	1/20/84 (18.4 ± 0.6)	1/20/84 (14.8 ± 0.5)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(17 ± 1)	(15 ± 1)
2nd RTI Analysis Day PPB	57 (21.5 ± 0.6)	57 (10.1 ± 0.2)	57 (26.1 ± 0.6)	54 (192 ± 6.1)	54 (192 ± 6.1)
NBS Concentration PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(192 ± 4)**	(192 ± 4)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A14

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	231	231	231	225	225
PPB	(155 ± 4.7)	(132 ± 2.8)	(147 ± 3.5)	(191 ± 6.1)	(191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day	395	395	395	371	371
PPB	(154 ± 4.6)	(135 ± 2.8)	(145 ± 3.5)	(199 ± 6.4)	(187 ± 6.0)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day	491	491	491	497	497
PPB	(142 ± 4.3)	(115 ± 2.4)	(126 ± 3.0)	(139 ± 4.4)	(149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 2nd RTI analysis than on the 1st, 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A15

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(307)	(126)	(102)	(364)	(400)
1st Analysis Date	12/07/83	12/07/83	12/07/83	12/02/83	12/02/83
PPB	(301)	(130)	(98.3)	(350)	(397)
2nd Analysis Date	12/15/83	12/15/83	12/15/83	12/19/83	12/19/83
PPB	(293)	(143)	(119)	(360)	(393)
RTI ANALYSIS					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/20/84	1/20/84
PPB	(317 ± 6.7)	(125 ± 2.6)	(108 ± 2.6)	(382 ± 12.2)	(418 ± 13.4
2nd RTI Analysis Day*	57	57	57	51	51
PPB	(327 ± 9.8)	(133 ± 2.8)	(119 ± 2.9)	(387 ± 12.4)	(404 ± 12.9
3rd RTI Analysis Day*	231	231	231	227	227
PPB	(299 ± 9.0)	(126 ± 2.6)	(100 ± 2.4)	(391 ± 12.5)	(404 ± 12.9
4th RTI Analysis Day*	395	395	395	370	370
PPB	(299 ± 9.0)	(126 ± 2.6)	(103 ± 2.5)	(378 ± 12.1)	(409 ± 13.1
5th RTI Analysis Day*	491	491	491		
PPB	(297 ± 8.9)	(123 ± 2.6)	(104 ± 2.5)	on audit	on audit
RTI QUALITY CONTROL**					
1st RTI Analysis Date	1/09/84	1/09/84	1/09/84	1/20/84	1/20/84
PPB	(162 ± 4.9)	(130 ± 2.7)	(148 ± 3.6)	(18.4 ± 0.6)	(14.8 ± 0.5)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(17 ± 1)**	(15 ± 1)**
2nd RTI Analysis Day	57	57	57	51	51
PPB	(21.5 ± 0.6)	(10.1 ± 0.2)	(26.1 ± 0.6)	(192 ± 6.1)	(192 ± 6.1)
NBS Concentration** PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(192 ± 4)**	(192 ± 4)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A15

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	231	231	231	227	227
PPB	(155 ± 4.7)	(132 ± 2.8)	(147 ± 3.5)	(191 ± 6.1)	(191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day	395	395	395	370	370
PPB	(154 ± 4.6)	(135 ± 2.8)	(145 ± 3.5)	(200 ± 6.4)	(195 ± 6.2)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day	491	491	491	497	497
PPB	(142 ± 4.3)	(115 ± 2.4)	(126 ± 3.0)	(139 ± 4.4)	(149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 1st and 2nd RTI analysis than on the 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP I COMPOUNDS
CYLINDER I-A16

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
MANUFACTURER ANALYSIS					
Theoretical PPB	(304)	(125)	(101)	(360)	(400)
1st Analysis Date PPB	12/05/83 (297)	12/05/83 (120)	12/05/83 (91.5)	12/12/83 (344)	12/12/83 (397)
2nd Analysis Date PPB	12/15/83 (293)	12/15/83 (135)	12/15/83 (87.9)	12/19/83 (355)	12/19/83 (382)
RTI ANALYSIS					
1st RTI Analysis Date PPB	1/09/84 (314 ± 9.4)	1/09/84 (122 ± 2.6)	1/09/84 (107 ± 2.6)	1/20/84 (377 ± 12.1)	1/20/84 (418 ± 13.4)
2nd RTI Analysis Day* PPB	57 (323 ± 9.7)	57 (128 ± 2.7)	57 (119 ± 2.9)	51 (379 ± 12.1)	51 (403 ± 12.9)
3rd RTI Analysis Day* PPB	on audit	on audit	on audit	on audit	on audit
4th RTI Analysis Day* PPB	395 (296 ± 8.9)	395 (126 ± 2.6)	395 (103 ± 2.5)	370 (368 ± 11.8)	370 (408 ± 13.1)
5th RTI Analysis Day* PPB	491 (295 ± 8.9)	491 (121 ± 2.5)	491 (104 ± 2.5)	on audit	on audit
RTI QUALITY CONTROL**					
1st RTI Analysis Date PPB	1/09/84 (162 ± 4.9)	1/09/84 (130 ± 2.7)	1/09/84 (148 ± 3.6)	1/20/84 (18.4 ± 0.6)	1/20/84 (14.8 ± 0.5)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(17 ± 1)**	(15 ± 1)**
2nd RTI Analysis Day PPB	57 (21.5 ± 0.6)	57 (10.1 ± 0.2)	57 (26.1 ± 0.6)	51 (192 ± 6.1)	51 (192 ± 6.1)
NBS Concentration** PPB	(19 ± 1)	(9 ± 1)	(22 ± 1)	(192 ± 4)**	(192 ± 4)**

(Continued)

STABILITY STUDY FOR GROUP I COMPOUNDS (Continued)
CYLINDER I-A16

ACTIVITY	COMPOUND				
	Carbon tetrachloride	Chloroform	Perchloroethylene	Benzene	Vinyl Chloride
RTI QUALITY CONTROL**					
3rd RTI Analysis Day	231	231	231	227	227
PPB	(155 ± 4.7)	(132 ± 2.8)	(147 ± 3.5)	(191 ± 6.1)	(191 ± 6.1)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
4th RTI Analysis Day	395	395	395	370	370
PPB	(154 ± 4.6)	(135 ± 2.8)	(145 ± 3.5)	(200 ± 6.4)	(195 ± 6.2)
NBS Concentration PPB	(154 ± 3)	(134 ± 3)	(145 ± 3)	(192 ± 4)	(192 ± 4)
5th RTI Analysis Day	491	491	491	497	497
PPB	(142 ± 4.3)	(115 ± 2.4)	(126 ± 3.0)	(139 ± 4.4)	(149 ± 4.8)
NBS Concentration PPB	(141 ± 3)	(120 ± 3)	(126 ± 3)	(133 ± 3)	(154 ± 3)

*Number of days after 1st RTI analysis date.

**NBS primary standard was analyzed as internal quality control on each day of RTI analysis unless otherwise indicated. Different NBS primary standards were used on 1st and 2nd RTI analysis than on the 3rd, 4th and 5th analysis for the analytes indicated.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A1

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(161)	(164)	(164)	(161)	(149)	(150)	(151)	(162)	NC
1st Analysis Date PPB	3/05/84 (144)	3/05/84 (167)	3/05/84 (152)	3/05/84 (167)	3/05/84 (152)	3/07/84 (161)	3/07/84 (153)	3/05/84 (201)	NC
2nd Analysis Date PPB	4/03/84 (133)	4/03/84 (168)	4/03/84 (148)	4/03/84 (141)	4/03/84 (143)	4/04/84 (170)	4/04/84 (148)	4/03/84 (192)	NC
RTI ANALYSIS									
1st Analysis Date PPB	5/28/84 (145 ± 10.2)†	5/28/84 (194 ± 10.7)†	5/14/84 (147 ± 7.1)	5/14/84 (156 ± 8.0)	5/14/84** (130 ± 4.4)†	5/14/84 (172 ± 6.7)	5/08/84** (143 ± 5.9)†	5/08/84** (157 ± 6.4)†	NC
2nd Analysis Day*** PPB	82 (130 ± 9.1)†	82 (187 ± 10.3)†	98 (145 ± 7.0)	99 (150 ± 7.7)	98 (153 ± 5.2)	98 (170 ± 6.6)	104 (168 ± 6.9)	104 (183 ± 7.5)	NC
3rd Analysis Day*** PPB	302 (110 ± 7.7)	302 (144 ± 7.9)	287 (140 ± 6.7)	302 (146 ± 7.4)	287 (160 ± 5.4)	287 (168 ± 6.6)	293 (173 ± 7.1)	293 (177 ± 7.3)	NC
4th Analysis Day*** PPB	449 (112 ± 7.8)	449 (140 ± 7.7)	452 (141 ± 6.8)	452 (135 ± 6.9)	452 (161 ± 5.5)	452 (168 ± 6.6)	458 (164 ± 6.7)	458 (174 ± 7.1)	NC
RTI QUALITY CONTROL****									
3rd Analysis Day PPB	302 (78.5 ± 5.5)	302 (132 ± 7.3)	287 (118 ± 5.7)	302 (131 ± 6.7)	287 (153 ± 5.2)	287 (190 ± 7.4)	293 (112 ± 4.6)	293 (149 ± 6.1)	302 (149 ± 7.5)
NBS Concen. PPB	(82.7 ± 9.6)	(137 ± 6)	(118 ± 1)	(123 ± 2)	(151 ± 5)	(193 ± 3)	(116 ± 4)	(150 ± 2)	(147 ± 3)
4th Analysis Day PPB	449 (85.2 ± 6.0)	449 (130 ± 7.2)	452 (120 ± 5.8)	452 (120 ± 6.1)	452 (154 ± 5.2)	452 (190 ± 7.4)	458 (119 ± 4.9)	458 (132 ± 5.4)	452 (139 ± 7.0)
NBS Concen. PPB	(82.7 ± 9.6)	(137 ± 6)	(118 ± 1)	(123 ± 2)	(151 ± 5)	(193 ± 3)	(116 ± 4)	(150 ± 2)	(147 ± 3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated. No Quality Control with NBS primary standards was performed during RTI 1st and 2nd analysis.

† = Questionable value.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A2

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(167)	(169)	(169)	(167)	(149)	(150)	(151)	(168)	NC
1st Analysis Date PPB	3/16/84 (110)	3/16/84 (140)	3/16/84 (135)	3/16/84 (108)	3/16/84 (147)	3/20/84 (163)	3/20/84 (152)	3/16/84 (175)	NC
2nd Analysis Date PPB	4/03/84 (107)	4/03/84 (146)	4/03/84 (144)	4/03/84 (139)	4/03/84 (141)	4/05/84 (165)	4/05/84 (147)	4/03/84 (184)	NC
RTI ANALYSIS									
1st Analysis Date PPB	5/28/84 (124 ± 8.7)†	5/28/84 (161 ± 8.9)†	5/14/84 (146 ± 7.0)	5/14/84 (158 ± 8.1)	5/14/84** (129 ± 4.4)†	5/14/84 (169 ± 6.6)	5/08/84** (141 ± 5.8)†	5/08/84** (163 ± 6.7)†	NC
2nd Analysis Day*** PPB	82 (146 ± 10.2)†	82 (178 ± 9.8)†	98 (143 ± 6.9)	98 (150 ± 7.7)	98 (152 ± 5.2)	98 (167 ± 6.5)	104 (166 ± 6.8)	104 (189 ± 7.7)	NC
3rd Analysis Day*** PPB	302 (107 ± 7.5)	302 (130 ± 7.2)	287 (141 ± 6.8)	302 (136 ± 6.9)	287 (158 ± 5.4)	287 (165 ± 6.4)	293 (167 ± 6.8)	293 (186 ± 7.6)	NC
4th Analysis Day*** PPB	449 (109 ± 7.6)	449 (128 ± 7.0)	452 (139 ± 6.7)	452 (139 ± 7.1)	452 (158 ± 5.4)	452 (164 ± 6.4)	458 (148 ± 6.1)	458 (164 ± 6.7)	NC
RTI QUALITY CONTROL****									
3rd Analysis Day PPB	302 (78.5 ± 5.5)	302 (132 ± 7.3)	287 (118 ± 5.7)	302 (131 ± 6.7)	287 (153 ± 5.2)	287 (190 ± 7.4)	293 (112 ± 4.6)	293 (149 ± 6.1)	302 (149 ± 7.5)
NBS Concen. PPB	(82.7 ± 9.6)	(137 ± 6)	(118 ± 1)	(123 ± 2)	(151 ± 5)	(193 ± 3)	(116 ± 4)	(150 ± 2)	(147 ± 3)
4th Analysis Day PPB	449 (85.2 ± 6.0)	449 (135 ± 7.4)	452 (120 ± 5.8)	452 (120 ± 6.1)	452 (154 ± 5.2)	452 (190 ± 7.4)	458 (119 ± 4.9)	458 (132 ± 5.4)	452 (139 ± 7.0)
NBS Concen. PPB	(82.7 ± 9.6)	(137 ± 6)	(118 ± 1)	(123 ± 2)	(151 ± 5)	(193 ± 3)	(116 ± 4)	(150 ± 2)	(147 ± 3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated. No Quality Control with NBS primary standards was performed during RTI 1st and 2nd analysis.

† = Questionable value.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A3

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(166)	(168)	(168)	(166)	(149)	(150)	(151)	(167)	NC
1st Analysis Date PPB	3/16/84 (120)	3/16/84 (133)	3/16/84 (142)	3/16/84 (111)	3/16/84 (154)	3/07/84 (169)	3/07/84 (161)	3/16/84 (205)	NC
2nd Analysis Date PPB	4/03/84 (104)	4/03/84 (138)	4/03/84 (151)	4/03/84 (143)	4/03/84 (144)	4/05/84 (172)	4/05/84 (153)	4/03/84 (208)	NC
RTI ANALYSIS									
1st Analysis Date PPB	5/28/84 (107 ± 7.5)	5/28/84 (151 ± 8.3)†	5/14/84 (147 ± 7.1)	5/14/84 (163 ± 8.3)	5/14/84** (131 ± 4.5)†	5/14/94 (173 ± 6.7)	5/08/84** (144 ± 5.9)†	5/08/84** (165 ± 6.8)†	NC
2nd Analysis Day*** PPB	82 (146 ± 10.2)†	82 (170 ± 9.4)†	98 (145 ± 7.0)	98 (157 ± 8.0)	98 (155 ± 5.3)	98 (170 ± 6.6)	104 (170 ± 7.0)	104 (196 ± 8.0)	NC
3rd Analysis Day*** PPB	302 (106 ± 7.4)	302 (123 ± 6.8)	287 (142 ± 6.8)	302 (139 ± 7.1)	287 (161 ± 5.5)	287 (168 ± 6.6)	293 (170 ± 7.0)	293 (192 ± 7.9)	NC
4th Analysis Day*** PPB	on audit	on audit	on audit	on audit	on audit	on audit	on audit	on audit	NC
RTI QUALITY CONTROL****									
3rd Analysis Day PPB	302 (78.5 ± 5.5)	302 (132 ± 7.3)	287 (118 ± 5.7)	302 (131 ± 6.7)	287 (153 ± 5.2)	287 (190 ± 7.4)	293 (112 ± 4.6)	293 (149 ± 6.1)	0 (149 ± 7.5)
NBS Concen. PPB	(82.7 ± 9.6)	(137 ± 6)	(118 ± 1)	(123 ± 2)	(151 ± 5)	(193 ± 3)	(116 ± 4)	(150 ± 2)	(147 ± 3)
4th Analysis Day PPB	449 (85.2 ± 6.0)	449 (135 ± 7.4)	452 (120 ± 5.8)	452 (120 ± 6.1)	452 (154 ± 5.2)	452 (190 ± 7.4)	458 (119 ± 4.9)	458 (132 ± 5.4)	452 (139 ± 7.0)
NBS Concen. PPB	(82.7 ± 9.6)	(137 ± 6)	(118 ± 1)	(123 ± 2)	(151 ± 5)	(193 ± 3)	(116 ± 4)	(150 ± 2)	(147 ± 3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated. No Quality Control with NBS primary standards was performed during RTI 1st and 2nd analysis.

† = Questionable value.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A4

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(15.4)	(15.8)	(15.7)	(15.5)	(14.9)	(15.0)	(15.1)	(15.7)	(15.3)
1st Analysis Date PPB	3/15/84 (14.0)	3/15/84 (16.3)	3/15/84 (16.3)	3/15/84 (10.7)	3/21/84 (11.5)	3/21/84 (11.9)	3/21/84 (15.0)	3/15/84 (17.8)	3/15/84 (11.6)
2nd Analysis Date PPB	4/02/84 (14.0)	4/02/84 (16.2)	4/02/84 (17.5)	4/02/84 (11.5)	4/05/84 (13.3)	4/05/84 (12.5)	4/05/84 (14.6)	4/02/84 (16.1)	4/02/84 (15.3)
RTI ANALYSIS									
1st Analysis Date PPB	5/24/84 (16.2 ± 1.1)	5/24/84 (20.2 ± 1.1)	5/14/84 (14.6 ± 0.7)	5/14/84 (15.3 ± 0.8)	5/14/84 (13.1 ± 0.4)**	5/14/84 (15.2 ± 0.6)	5/14/84** (13.7 ± 0.6)†	5/14/84** (11.3 ± 0.5)†	5/20/84 (16.9 ± 0.8)†
2nd Analysis Day*** PPB	87 (17.6 ± 1.2)	87 (19.4 ± 1.1)	98 (14.7 ± 0.7)	93 (14.4 ± 0.7)	98 (15.1 ± 0.5)	98 (15.4 ± 0.6)	98 (16.3 ± 0.7)	98 (16.5 ± 0.7)	93 (14.5 ± 0.7)
3rd Analysis Day*** PPB	on audit	on audit	on audit	on audit	on audit	on audit	on audit	on audit	on audit
4th Analysis Day*** PPB	454 (15.9 ± 1.1)	454 (19.0 ± 1.0)	449 (14.2 ± 0.7)	443 (15.5 ± 0.8)	449 (16.0 ± 0.5)	449 (15.0 ± 0.6)	449 (15.6 ± 0.6)	449 (14.5 ± 0.6)	443 (13.3 ± 0.7)
RTI QUALITY CONTROL****									
3rd Analysis Day PPB	309 (14.1 ± 1.0)	309 (16.9 ± 0.9)	297 (10.9 ± 0.5)	310 (8.8 ± 0.4)	297 (10.7 ± 0.4)	297 (19.4 ± 0.8)	297 (8.2 ± 0.3)	297 (9.5 ± 0.4)	310 (11.4 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
4th Analysis Day PPB	454 (14.0 ± 1.0)	454 (16.9 ± 0.9)	449 (11.6 ± 0.6)	443 (9.1 ± 0.5)	449 (11.0 ± 0.4)	449 (19.3 ± 0.8)	449 (8.4 ± 0.3)	449 (8.8 ± 0.4)	443 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated. No Quality Control with NBS primary standards was performed during RTI 1st and 2nd analysis.

† = Questionable value.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A5

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(15.5)	(16.0)	(15.9)	(15.7)	(15.0)	(15.0)	(15.0)	(15.9)	(15.5)
1st Analysis Date PPB	3/14/84 (8.9)	3/14/84 (7.8)	3/14/84 (16.9)	3/14/84 (11.2)	3/21/84 (9.6)	3/21/84 (11.3)	3/21/84 (16.0)	3/14/84 (18.2)	3/14/84 (11.3)
2nd Analysis Date PPB	4/02/84 (8.8)	4/02/84 (7.4)	4/02/84 (18.2)	4/02/84 (11.8)	4/05/84 (15.6)	4/05/84 (12.7)	4/05/84 (15.1)	4/02/84 (16.0)	4/02/84 (15.2)
RTI ANALYSIS									
1st Analysis Date PPB	5/24/84 (13.4 ± 0.9)†	5/24/84 (10.6 ± 0.6)†	5/14/84 (15.1 ± 0.7)	5/20/84 (14.6 ± 0.7)	5/14/84** (13.5 ± 0.5)†	5/14/84 (15.5 ± 0.6)	5/14/84** (13.8 ± 0.6)†	5/20/84** (16.2 ± 0.7)	5/20/84 (16.8 ± 0.8)†
2nd Analysis Day*** PPB	87 (13.8 ± 1.0)†	87 (8.5 ± 0.5)	98 (15.1 ± 0.7)	93 (14.7 ± 0.7)	98 (15.5 ± 0.5)	98 (15.4 ± 0.6)	98 (16.7 ± 0.7)	98 (16.8 ± 0.7)	93 (14.8 ± 0.7)
3rd Analysis Day*** PPB	309 (10.3 ± 0.7)	309 (8.0 ± 0.4)	on audit	310 (14.2 ± 0.7)	on audit	on audit	on audit	on audit	310 (14.1 ± 0.7)
4th Analysis Day*** PPB	454 (10.8 ± 0.8)	454 (9.3 ± 0.6)	449 (15.3 ± 0.7)	443 (15.4 ± 0.8)	449 (16.3 ± 0.6)	449 (14.6 ± 0.6)	449 (16.3 ± 0.7)	449 (14.1 ± 0.6)	443 (13.9 ± 0.7)
RTI QUALITY CONTROL****									
3rd Analysis Day PPB	309 (14.1 ± 1.0)	309 (16.9 ± 0.9)	297 (10.9 ± 0.5)	310 (8.8 ± 0.4)	297 (10.7 ± 0.4)	297 (19.4 ± 0.8)	297 (8.2 ± 0.3)	297 (9.5 ± 0.4)	310 (11.4 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
4th Analysis Day PPB	454 (14.0 ± 1.0)	454 (16.9 ± 0.9)	449 (11.6 ± 0.6)	443 (9.1 ± 0.5)	449 (11.0 ± 0.4)	449 (19.3 ± 0.8)	449 (8.4 ± 0.3)	449 (8.8 ± 0.4)	443 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated. No Quality Control with NBS primary standards was performed during RTI 1st and 2nd analysis.

† = Questionable value.

NC = This compound was not included in this cylinder.

STABILJTY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A6

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(15.9)	(16.3)	(16.2)	(16.0)	(15.0)	(15.0)	(15.0)	(16.2)	(15.8)
1st Analysis Date	3/14/84	3/14/84	3/14/84	3/14/84	3/20/84	5/14/84	3/20/84	3/14/84	3/14/84
PPB	(8.6)	(7.0)	(15.8)	(11.4)	(10.8)	(13.3)	(15.5)	(17.5)	(11.1)
2nd Analysis Date	3/30/84	3/30/84	3/30/84	3/30/84	4/06/84	8/19/84	4/06/84	3/30/84	3/30/84
PPB	(8.0)	(7.1)	(18.3)	(12.7)	(13.9)	(12.2)	(14.2)	(18.2)	(14.4)
RTI ANALYSIS									
1st Analysis Date	5/24/84	5/24/84	5/14/84	5/20/84	5/14/84**	5/14/84	5/14/84**	5/14/84**	5/20/84
PPB	(12.0 ± 0.8)	(7.5 ± 0.4)	(15.6 ± 0.7)	(14.2 ± 0.7)	(13.4 ± 0.5)	(15.2 ± 0.6)	(13.6 ± 0.6)	(16.6 ± 0.7)	(17.4 ± 0.9)†
2nd Analysis Day***	87	87	98	93	98	98	98	98	93
PPB	(11.6 ± 0.8)	(6.7 ± 0.4)	(15.4 ± 0.7)	(15.7 ± 0.8)	(15.4 ± 0.5)	(14.9 ± 0.6)	(16.6 ± 0.7)	(16.0 ± 0.7)	(15.3 ± 0.8)
3rd Analysis Day***	309	309		310					310
PPB	(12.6 ± 0.9)	(7.3 ± 0.4)	on audit	(14.2 ± 0.7)	on audit	on audit	on audit	on audit	(14.3 ± 0.7)
4th Analysis Day***	454	454	449	443	449	449	449	449	443
PPB	(12.2 ± 0.8)	(7.5 ± 0.4)	(15.1 ± 0.7)	(15.8 ± 0.8)	(16.2 ± 0.5)	(14.0 ± 0.5)	(16.0 ± 0.7)	(11.8 ± 0.5)	(14.0 ± 0.7)
RTI QUALITY CONTROL****									
3rd Analysis Day	309	309	297	310	297	297	297	297	310
PPB	(14.1 ± 1.0)	(16.9 ± 0.9)	(10.9 ± 0.5)	(8.8 ± 0.4)	(10.7 ± 0.4)	(19.4 ± 0.8)	(8.2 ± 0.3)	(9.5 ± 0.4)	(11.4 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
4th Analysis Day	454	454	449	443	449	449	449	449	443
PPB	(14.0 ± 1.0)	(16.9 ± 0.9)	(11.6 ± 0.6)	(9.1 ± 0.5)	(11.0 ± 0.4)	(19.3 ± 0.8)	(8.4 ± 0.3)	(8.8 ± 0.4)	(11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated. No Quality Control with NBS primary standards was performed during RTI 1st and 2nd analysis.

† = Questionable value.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A7

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER AN[illegible]SIS									
Theoretical PPB	(10.0)	(10.0)	(10.0)	(12.0)	(10.1)	(10.4)	(9.9)	(10.0)	(10.0)
1st Analysis Date PPB	11/13/84 (11.7)	11/13/84 (9.3)	11/13/84 (9.1)	11/13/84 (8.6)	12/12/84 (9.9)	12/12/84 (9.5)	12/12/84 (8.7)	11/13/84 (10.4)	11/13/84 (10.0)
2nd Analysis Date PPB	1/02/85 (8.7)	1/02/85 (9.1)	1/02/85 (9.3)	1/02/85 (8.3)	1/18/85 (8.3)	1/18/85 (8.1)	1/18/85 (9.5)	1/02/85 (10.7)	1/02/85 (10.4)
RTI ANALYSIS									
1st Analysis Date PPB	3/29/85 (7.9 ± 0.6)	3/29/85 (9.6 ± 0.5)	3/07/85 (9.0 ± 0.4)	3/15/85 (9.8 ± 0.5)	3/07/85 (9.4 ± 0.3)	3/07/85 (10.8 ± 0.4)	3/07/85 (9.9 ± 0.4)	3/07/85 (10.2 ± 0.4)	3/15/85 (10.1 ± 0.5)
2nd Analysis Day*** PPB	on audit	on audit	on audit	on audit	on audit	on audit	on audit	on audit	on audit
RTI QUALITY CONTROL****									
1st Analysis Date PPB	3/29/85 (14.1 ± 1.0)	3/29/85 (16.9 ± 0.9)	3/07/85 (10.9 ± 0.5)	3/15/85 (9.3 ± 0.5)	3/07/85 (10.7 ± 0.4)	3/07/85 (19.4 ± 0.8)	3/07/85 (8.2 ± 0.3)	3/07/85 (9.5 ± 0.4)	3/15/85 (11.9 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day PPB	147 (12.0 ± 0.8)	147 (14.1 ± 0.8)	152 (11.6 ± 0.6)	144 (9.1 ± 0.5)	152 (11.0 ± 0.4)	152 (19.3 ± 0.8)	152 (8.4 ± 0.3)	152 (8.8 ± 0.4)	144 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A8

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(10.0)	(10.0)	(10.0)	(10.0)	(10.1)	(10.0)	(9.9)	(10.0)	(10.0)
1st Analysis Date PPB	11/06/84 (8.4)	11/06/84 (9.4)	11/06/84 (9.3)	11/06/84 (8.7)	12/11/84 (9.8)	12/11/84 (8.7)	12/11/84 (9.2)	11/06/84 (10.5)	11/06/84 (10.3)
2nd Analysis Date PPB	12/28/84 (11.0)	12/28/84 (9.2)	12/28/84 (9.4)	12/28/84 (8.7)	1/15/85 (11.9)	1/15/85 (9.2)	12/28/84 (9.6)	12/28/84 (11.2)	1/02/85 (10.6)
RTI ANALYSIS									
1st Analysis Date PPB	3/29/85 (10.7 ± 0.7)	3/29/85 (9.6 ± 0.5)	3/07/85 (9.2 ± 0.4)	3/15/85 (10.3 ± 0.5)	3/07/85 (9.6 ± 0.3)	3/07/85 (10.6 ± 0.4)	3/07/85 (9.9 ± 0.4)	3/07/85 (10.2 ± 0.4)	3/15/85 (10.1 ± 0.5)
2nd Analysis Day*** PPB	147 (10.1 ± 0.7)	147 (9.0 ± 0.5)	152 (9.5 ± 0.5)	144 (8.5 ± 0.4)	152 (9.7 ± 0.3)	152 (11.4 ± 0.4)	152 (10.5 ± 0.4)	152 (8.5 ± 0.3)	144 (9.4 ± 0.5)
RTI QUALITY CONTROL****									
1st Analysis Date PPB	3/29/85 (14.1 ± 1.0)	3/29/85 (16.9 ± 0.9)	3/07/85 (10.9 ± 0.5)	3/15/85 (9.3 ± 0.5)	3/07/85 (10.7 ± 0.4)	3/07/85 (19.4 ± 0.8)	3/07/85 (8.2 ± 0.3)	3/07/85 (9.5 ± 0.4)	3/15/85 (11.9 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day PPB	147 (12.0 ± 0.8)	147 (14.1 ± 0.8)	152 (11.6 ± 0.6)	144 (9.1 ± 0.5)	152 (11.0 ± 0.4)	152 (19.3 ± 0.8)	152 (8.4 ± 0.3)	152 (8.8 ± 0.4)	144 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A9

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
					MANUFACTURER ANALYSIS				
Theoretical PPB	(10.0)	(10.0)	(10.0)	(10.0)	(10.1)	(10.2)	(9.9)	(10.0)	(10.0)
1st Analysis Date PPB	11/07/84 (8.4)	11/07/84 (9.2)	11/07/84 (9.1)	11/07/84 (8.1)	12/01/84 (11.8)	12/01/84 (8.9)	12/01/84 (9.4)	11/07/84 (10.4)	11/07/84 (10.2)
2nd Analysis Date PPB	12/31/84 (8.8)	12/31/84 (9.0)	12/31/84 (9.1)	12/31/84 (8.5)	1/15/85 (11.9)	1/15/85 (8.4)	1/15/85 (12.1)	12/31/84 (10.6)	12/31/85 (10.4)
					RTI ANALYSIS				
1st Analysis Date PPB	3/29/85 (10.7 ± 0.7)	3/29/85 (9.6 ± 0.5)	3/07/85 (9.0 ± 0.4)	3/15/85 (10.0 ± 0.5)	3/07/85 (9.5 ± 0.3)	3/07/85 (10.7 ± 0.4)	3/07/85 (9.5 ± 0.4)	3/07/85 (10.3 ± 0.4)	3/15/85 (10.0 ± 0.5)
2nd Analysis Day*** PPB	147 (10.1 ± 0.7)	147 (8.9 ± 0.5)	152 (9.4 ± 0.5)	144 (7.7 ± 0.4)	152 (9.6 ± 0.3)	152 (11.2 ± 0.4)	152 (10.4 ± 0.4)	152 (7.8 ± 0.3)	144 (9.3 ± 0.5)
					RTI QUALITY CONTROL****				
1st Analysis Date PPB	3/29/85 (14.1 ± 1.0)	3/29/85 (16.9 ± 0.9)	3/07/85 (10.9 ± 0.5)	3/15/85 (9.3 ± 0.5)	3/07/85 (10.7 ± 0.4)	3/07/85 (19.4 ± 0.8)	3/07/85 (8.2 ± 0.3)	3/07/85 (9.5 ± 0.4)	3/15/85 (11.9 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day PPB	147 (12.0 ± 0.8)	147 (14.1 ± 0.8)	152 (11.6 ± 0.6)	144 (9.1 ± 0.5)	152 (11.0 ± 0.4)	152 (19.3 ± 0.8)	152 (8.4 ± 0.3)	152 (8.8 ± 0.4)	144 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A10

ACTIVITY		COMPOUND								
		Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS										
Theoretical	PPB	(30.1)	(30.0)	(30.0)	(30.0)	(30.9)	(30.0)	(29.2)	(30.0)	(30.0)
1st Analysis	Date	11/14/84	11/14/84	11/14/84	11/14/84	12/26/84	12/26/84	12/26/84	11/14/84	11/14/84
	PPB	(27.7)	(27.8)	(27.7)	(24.9)	(25.4)	(29.3)	(26.2)	(32.4)	(30.1)
2nd Analysis	Date	1/04/85	1/04/85	1/04/85	1/04/85	1/22/85	1/22/85	1/22/85	1/04/85	1/04/85
	PPB	(34.3)	(29.0)	(26.8)	(26.8)	(27.7)	(30.1)	(27.9)	(33.3)	(31.7)
RTI ANALYSIS										
1st Analysis	Date	3/27/85	3/27/85	3/05/85	3/13/85	3/05/85	3/05/85	3/05/85	3/05/85	3/13/85
	PPB	(26.8 ± 1.9)	(28.0 ± 1.5)	(28.8 ± 1.4)	(30.2 ± 1.5)	(29.7 ± 1.0)	(32.1 ± 1.3)	(31.4 ± 1.3)	(30.8 ± 1.3)	(30.6 ± 1.5)
2nd Analysis	Day***	147	147	155	147	155	155	155	155	147
	PPB	(24.2 ± 1.7)	(29.0 ± 1.6)	(28.2 ± 1.4)	(27.3 ± 1.4)	(29.5 ± 1.0)	(31.4 ± 1.2)	(29.4 ± 1.2)	(32.6 ± 1.3)	(27.7 ± 1.4)
RTI QUALITY CONTROL****										
1st Analysis	Date	3/27/85	3/27/85	3/05/85	3/13/85	3/05/85	3/05/85	3/05/85	3/05/85	3/13/85
	PPB	(13.2 ± 0.9)	(16.8 ± 0.9)	(11.4 ± 0.5)	(9.5 ± 0.5)	(11.1 ± 0.4)	(21.0 ± 0.8)	(9.1 ± 0.4)	(10.0 ± 0.4)	(12.5 ± 0.6)
NBS Concen.	PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis	Day	147	147	155	147	155	155	155	155	147
	PPB	(12.5 ± 0.9)	(16.9 ± 0.9)	(11.3 ± 0.5)	(8.6 ± 0.4)	(11.2 ± 0.4)	(18.9 ± 0.7)	(8.3 ± 0.3)	(9.1 ± 0.4)	(11.3 ± 0.6)
NBS Concen.	PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A11

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(30.1)	(30.0)	(30.0)	(30.0)	(30.3)	(30.0)	(29.7)	(30.0)	(30.0)
1st Analysis Date PPB	11/28/84 (30.9)	11/28/84 (24.9)	11/28/84 (27.8)	11/28/84 (24.4)	12/21/84 (31.6)	12/21/84 (29.0)	12/21/84 (24.9)	11/28/84 (32.2)	11/28/84 (30.0)
2nd Analysis Date PPB	1/04/85 (27.1)	1/04/85 (29.3)	1/04/85 (27.1)	1/04/85 (25.3)	1/22/85 (28.0)	1/22/85 (29.7)	1/22/85 (29.3)	1/04/85 (32.4)	1/04/85 (30.8)
RTI ANALYSIS									
1st Analysis Date PPB	3/27/85 (26.1 ± 1.8)	3/27/85 (26.7 ± 1.5)	3/05/85 (28.9 ± 1.4)	3/13/85 (30.2 ± 1.5)	3/05/85 (30.5 ± 1.0)	3/05/85 (32.4 ± 1.3)	3/05/85 (32.2 ± 1.3)	3/05/85 (31.1 ± 1.3)	3/13/85 (30.6 ± 1.5)
2nd Analysis Day*** PPB	147 (24.1 ± 1.7)	147 (28.0 ± 1.5)	155 (27.6 ± 1.3)	147 (26.3 ± 1.3)	155 (29.7 ± 1.0)	155 (31.3 ± 1.2)	155 (29.7 ± 1.2)	155 (33.7 ± 1.4)	147 (27.5 ± 1.4)
RTI QUALITY CONTROL****									
1st Analysis Date PPB	3/27/85 (13.2 ± 0.9)	3/27/85 (16.8 ± 0.9)	3/05/85 (11.4 ± 0.5)	3/13/85 (9.5 ± 0.5)	3/05/85 (11.1 ± 0.4)	3/05/85 (21.0 ± 0.8)	3/05/85 (9.1 ± 0.4)	3/05/85 (10.0 ± 0.4)	3/13/85 (12.5 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day PPB	147 (12.5 ± 0.9)	147 (16.9 ± 0.9)	155 (11.3 ± 0.5)	147 (8.6 ± 0.4)	155 (11.2 ± 0.4)	155 (18.9 ± 0.7)	155 (8.3 ± 0.3)	155 (9.1 ± 0.4)	147 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A12

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(10.0)	(29.9)	(10.0)	(9.9)	(9.9)	(29.6)	(29.8)	(29.9)	(29.9)
1st Analysis Date	12/03/84	12/03/84	12/03/84	12/03/84	12/12/84	12/12/84	12/12/84	12/03/84	12/03/84
PPB	(7.6)	(27.1)	(9.4)	(9.4)	(7.8)	(27.4)	(36.2)	(32.1)	(32.7)
2nd Analysis Date	1/08/85	1/08/85	1/08/85	1/08/85	1/21/85	1/21/85	1/21/85	1/08/85	1/08/85
PPB	(8.7)	(28.1)	(9.7)	(8.9)	(9.7)	(27.4)	(33.2)	(34.1)	(32.5)
RTI ANALYSIS									
1st Analysis Date	3/29/85	3/29/85	3/07/85	3/14/85	3/07/85	3/07/85	3/07/85	3/07/85	3/14/85
PPB	(10.4 ± 0.7)	(26.4 ± 1.5)	(9.6 ± 0.5)	(10.3 ± 0.5)	(9.7 ± 0.3)	(31.0 ± 1.2)	(31.0 ± 1.3)	(30.4 ± 1.2)	(30.2 ± 1.5)
2nd Analysis Day***	146	146	153	146	153	153	153	153	146
PPB	(10.4 ± 0.7)	(27.2 ± 1.5)	(9.6 ± 0.5)	(10.3 ± 0.5)	(9.2 ± 0.3)	(31.5 ± 1.2)	(30.5 ± 1.3)	(31.3 ± 1.3)	(29.3 ± 1.5)
RTI QUALITY CONTROL****									
1st Analysis Date	3/29/85	3/29/85	3/07/85	3/14/85	3/07/85	3/07/85	3/07/85	3/07/85	3/14/85
PPB	(14.1 ± 1.0)	(16.1 ± 0.9)	(10.9 ± 0.5)	(8.8 ± 0.4)	(10.7 ± 0.4)	(19.4 ± 0.8)	(8.2 ± 0.3)	(9.5 ± 0.4)	(11.4 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day	146	146	153	146	153	153	153	153	146
PPB	(13.3 ± 0.9)	(17.0 ± 0.9)	(11.3 ± 0.5)	(8.6 ± 0.4)	(11.2 ± 0.4)	(18.9 ± 0.7)	(8.3 ± 0.3)	(9.1 ± 0.4)	(11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A13

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(10.0)	(30.3)	(10.0)	(10.0)	(10.0)	(30.2)	(30.0)	(30.0)	(30.0)
1st Analysis Date	12/04/84	12/04/84	12/04/84	12/04/84	12/21/84	12/21/84	12/21/84	12/04/84	12/04/84
PPB	(10.2)	(30.2)	(10.0)	(9.1)	(10.7)	(29.8)	(31.5)	(35.0)	(32.8)
2nd Analysis Date	1/09/85	1/09/85	1/09/85	1/09/85	1/21/85	1/21/85	1/21/85	1/09/85	1/09/85
PPB	(9.6)	(30.0)	(9.2)	(9.1)	(10.1)	(28.9)	(31.9)	(35.1)	(32.2)
RTI ANALYSIS									
1st Analysis Date	3/29/85	3/29/85	3/07/85	3/14/85	3/07/85	3/07/85	3/07/85	3/07/85	3/14/85
PPB	(10.6 ± 0.7)	(28.7 ± 1.6)	(9.9 ± 0.5)	(10.3 ± 0.5)	(10.1 ± 0.3)	(33.3 ± 1.3)	(32.2 ± 1.3)	(32.1 ± 1.3)	(30.4 ± 1.5)
2nd Analysis Day***	146	146	153	146	153	153	153	153	146
PPB	(10.4 ± 0.7)	(26.9 ± 1.5)	(9.8 ± 0.5)	(9.8 ± 0.5)	(10.6 ± 0.4)	(32.8 ± 1.3)	(31.4 ± 1.3)	(32.9 ± 1.3)	(29.3 ± 1.5)
RTI QUALITY CONTROL****									
1st Analysis Date	3/29/85	3/29/85	3/07/85	3/14/85	3/07/85	3/07/85	3/07/85	3/07/85	3/14/85
PPB	(14.1 ± 1.0)	(16.1 ± 0.9)	(10.9 ± 0.5)	(8.8 ± 0.4)	(10.7 ± 0.4)	(19.4 ± 0.8)	(8.2 ± 0.3)	(9.5 ± 0.4)	(11.4 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day	146	146	153	146	153	153	153	153	146
PPB	(13.3 ± 0.9)	(17.0 ± 0.9)	(11.3 ± 0.5)	(8.6 ± 0.4)	(11.2 ± 0.4)	(18.9 ± 0.7)	(8.3 ± 0.3)	(9.1 ± 0.4)	(11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A14

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(41.6)	(20.0)	(40.1)	(40.1)	(40.1)	(20.1)	(20.1)	(20.2)	(20.1)
1st Analysis Date PPB	12/05/84 (47.7)	12/05/84 (17.7)	12/05/84 (35.9)	12/05/84 (33.0)	12/26/84 (27.4)	12/26/84 (19.8)	12/26/84 (19.3)	12/05/84 (21.3)	12/05/84 (19.9)
2nd Analysis Date PPB	1/11/85 (43.9)	1/11/85 (16.7)	1/11/85 (35.0)	1/11/85 (33.4)	1/23/85 (33.7)	1/23/85 (19.2)	1/23/85 (20.8)	1/11/85 (22.2)	1/11/85 (19.9)
RTI ANALYSIS									
1st Analysis Date PPB	3/27/85 (37.3 ± 2.6)	3/27/85 (16.4 ± 0.9)	3/05/85 (37.9 ± 1.8)	3/13/85 (41.0 ± 2.1)	3/05/85 (36.8 ± 1.3)	3/05/85 (21.9 ± 0.9)	3/05/85 (21.8 ± 0.9)	3/05/85 (21.9 ± 0.9)	3/13/85 (19.8 ± 1.0)
2nd Analysis Day*** PPB	148 (38.1 ± 2.7)	148 (16.4 ± 0.9)	156 (38.0 ± 1.8)	148 (38.8 ± 2.0)	156 (38.6 ± 1.3)	156 (21.8 ± 0.8)	156 (20.6 ± 0.8)	156 (24.7 ± 1.0)	148 (18.2 ± 0.9)
RTI QUALITY CONTROL****									
1st Analysis Date PPB	3/27/85 (13.2 ± 0.9)	3/27/85 (16.8 ± 0.9)	3/05/85 (11.4 ± 0.5)	3/13/85 (9.5 ± 0.5)	3/05/85 (11.1 ± 0.4)	3/05/85 (21.0 ± 0.8)	3/05/85 (9.1 ± 0.4)	3/05/85 (10.0 ± 0.4)	3/13/85 (12.5 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day PPB	148 (13.3 ± 0.9)	148 (17.0 ± 0.9)	156 (11.2 ± 0.5)	148 (8.5 ± 0.4)	156 (11.2 ± 0.4)	156 (18.9 ± 0.7)	156 (8.5 ± 0.3)	156 (9.3 ± 0.4)	148 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

STABILITY STUDY FOR GROUP II COMPOUNDS*
CYLINDER II-A15

ACTIVITY	COMPOUND								
	Acetonitrile	Methyl Ethyl Ketone	Trichloro-ethylene	1,2-Dichloro-ethane	Trichloro-fluoro-methane (F-11)	Bromomethane	Dichlorodi-fluorometh-ane (F-12)	1,2-Dibro-moethane	1,1,1-Trichloro-ethane
MANUFACTURER ANALYSIS									
Theoretical PPB	(41.5)	(20.0)	(40.0)	(40.0)	(40.0)	(20.1)	(20.0)	(20.1)	(20.0)
1st Analysis Date PPB	12/07/84 (45.1)	12/07/84 (18.8)	12/07/84 (36.6)	12/07/84 (33.2)	12/27/84 (35.1)	12/27/84 (19.7)	12/27/84 (22.2)	12/07/84 (22.4)	12/07/84 (19.9)
2nd Analysis Date PPB	1/14/85 (43.9)	1/14/85 (18.4)	1/14/85 (38.4)	1/14/85 (34.4)	1/23/85 (33.8)	1/23/85 (19.2)	1/23/85 (16.1)	1/14/85 (23.1)	1/14/85 (20.3)
RTI ANALYSIS									
1st Analysis Date PPB	3/27/85 (36.3 ± 2.5)	3/27/85 (18.3 ± 1.0)	3/05/85 (38.4 ± 1.8)	3/13/85 (40.7 ± 2.1)	3/05/85 (36.6 ± 1.2)	3/05/85 (21.9 ± 0.9)	3/05/85 (21.9 ± 0.9)	3/05/85 (21.9 ± 0.9)	3/13/85 (20.1 ± 1.0)
2nd Analysis Day*** PPB	148 (37.6 ± 2.6)	148 (18.5 ± 1.0)	156 (38.4 ± 1.8)	148 (39.3 ± 2.0)	156 (38.5 ± 1.3)	156 (22.0 ± 0.9)	156 (20.8 ± 0.9)	156 (21.7 ± 0.9)	148 (18.2 ± 0.9)
RTI QUALITY CONTROL****									
1st Analysis Date PPB	3/27/85 (13.2 ± 0.9)	3/27/85 (16.8 ± 0.9)	3/05/85 (11.4 ± 0.5)	3/13/85 (9.5 ± 0.5)	3/05/85 (11.1 ± 0.4)	3/05/85 (21.0 ± 0.8)	3/05/85 (9.1 ± 0.4)	3/05/85 (10.0 ± 0.4)	3/13/85 (12.5 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)
2nd Analysis Day PPB	148 (13.3 ± 0.9)	148 (17.0 ± 0.9)	156 (11.2 ± 0.5)	148 (8.5 ± 0.4)	156 (11.2 ± 0.4)	156 (18.9 ± 0.7)	156 (8.5 ± 0.3)	156 (9.3 ± 0.4)	148 (11.3 ± 0.6)
NBS Concen. PPB	(12.1 ± 1.9)	(15.8 ± 2.0)	(11.6 ± 0.3)	(9.14 ± 0.59)	(11.3 ± 0.6)	(23.0 ± 0.6)	(9.41 ± 0.37)	(9.61 ± 0.29)	(11.9 ± 0.3)

*Calibration was performed using permeation devices unless otherwise specified.

**Calibration was performed using stainless steel sphere dilution method.

***Number of days after 1st RTI analysis date.

****NBS primary standard was analyzed as internal Quality Control on each day of RTI analysis unless otherwise indicated.

NC = This compound was not included in this cylinder.

APPENDIX B
AUDIT INSTRUCTIONS

R E S E A R C H   T R I A N G L E   I N S T I T U T E

Center for Environmental Measurements

Date ____________

Name ______________________________
Organization ________________________
Address ____________________________

Dear ____________________:

Research Triangle Institute (RTI) has been requested to provide you with ________ cylinder(s) of parts-per-billion level multicomponent mixture containing ____ in nitrogen for a Volatile Organic Sampling Train (VOST) audit by ________. We are shipping these cylinders today by __________ as per the request. Please draw the sample into your sampling train through a glass manifold following the instruction #3 (enclosure) and provide your analysis results to the Project Officer, ______________________. A glass manifold and necessary equipment were also provided to draw the sample from the audit cylinder for your convenience.

Please note that these cylinders have been analyzed several times and are very valuable. We urge you to use only the amount of gas required to conduct the audit of your analytical system and return the cylinders and all the equipment (glass manifold etc.) sent to you as soon as possible so that other organizations may also participate in the audit program. I am requesting that you submit the audit results to the Project Officer or to me and ship the cylinders and all other equipment back to Research Triangle Institute, Building #6, Post Office Box 12194, Research Triangle Park, North Carolina 27709, within 15 days of the date of delivery at your cost. We would appreciate your cooperation in this regard.

If you have any questions or comments concerning these audit cylinders, please feel free to call me at (919) 541-6483.

Sincerely,

RKM Jayanty

R.K.M. Jayanty
Project Leader

cc: Darryl von Lehmden,
EMSL/EPA

RJ:dw

Post Office Box 12194 Research Triangle Park, North Carolina 27709 Telephone: 919 541-6000

INSTRUCTION SET NO. 1

INSTRUCTIONS FOR THE SAMPLING AND ANALYSIS OF VOLATILE POHC FROM QUALITY ASSURANCE AUDIT CYLINDERS USING THE BAG TECHNIQUE

1.0 PURPOSE

This audit is intended to assess and document the accuracy and precision of the principle organic hazardous constituents (POHC) using the bag technique during trial burns at hazardous waste burning facilities. This audit also can be used to determine the proficiency of source testing organization prior to the actual trial burn tests.

2.0 PRINCIPLE

A gas sample containing POHC is drawn from an audit gas cylinder into a bag. The collected POHC are analyzed by gas chromatography according to the method specifications and procedures.

3.0 AUDIT MATERIAL (GAS CYLINDERS)

The audit material is contained in gas cylinders. A maximum of 5 L of audit gas is to be used for each test run. A two-stage gas regulator, 1/4-inch male/female glass joints, and Teflon® tubing are supplied for use with the gas cylinder.

4.0 PROCEDURES

The following step-by-step procedures should be used for sample collection and analysis using the bag technique.

Step A. Evacuate the bag with a vacuum pump and fill the bag with approximately 5 L of organic-free nitrogen from a gas cylinder. Tedlar® bags are recommended. Determine the hazardous constituents of interest by gas chromatography. Report the concentrations determined as Blank Value 1. The blank value must be not more than twice the detection limit. If it is higher, the bag cleaning procedure should be repeated.

Step B. After the blank analysis, evacuate the bag with a vacuum pump and fill the bag with approximately 5 L of audit gas from the audit cylinder. The 1/4 inch male/female glass joints that are supplied should be used as connections to the bag and the audit cylinder. Minimum Teflon® tubing should be used. Determine the POHC of interest by gas chromatography. Report the concentrations of each constituent as Analysis Result 1.

Step C. Evacuate the bag contents and fill the bag with organic free nitrogen (Cleaning Step 1). After 3 minutes, evacuate the bag contents and fill the bag again with nitrogen (Cleaning Step 2). After three minutes, repeat the evacuation procedure and fill the bag with 5 L of nitrogen (Blank 2). Determine the concentration of the bag contents by gas chromatography and report the measured concentration as Blank Value 2. The blank value must not be more than twice the detection limit. If it is higher, the bag cleaning procedure should be repeated.

Step D. Evacuate the bag contents and fill the bag with approximately 5 L of audit gas from the audit cylinder. Determine the POHC of interest by gas chromatography. Report the concentrations determined as Analysis Result 2.

Step E. Repeat Step C and report the measured concentration of the bag contents as Blank Value 3. The blank value must not be more than twice the detection limit. If it is higher, the bag cleaning procedures should be repeated.

Step F. Evacuate the bag contents and fill the bag with approximately 5 L of audit gas from the audit cylinder. Determine the POHC of interest by gas chromatography. Report the concentrations determined as Analysis Result 3.

5.0 SAMPLE ANALYSIS

Follow the procedures described in the method used for sample analysis, calibration, and calculations. Submit the results to the Project Officer and to the audit supervisor for evaluation.

INSTRUCTIONS FOR THE SAMPLING AND ANALYSIS OF VOLATILE POHC FROM QUALITY ASSURANCE AUDIT CYLINDERS USING THE VOLATILE ORGANIC SAMPLING TRAIN

1.0 PURPOSE

This audit is intended to assess and document the accuracy and precision of the volatile organic sampling train (VOST) when used during trial burns at hazardous waste burning facilities. This audit also can be used to determine the proficiency of source testing organization prior to the actual trial burn tests.

2.0 PRINCIPLE

A gas sample containing principal organic hazardous constituents (POHC) is passed from an audit gas cylinder into a glass manifold and is used in place of the test site stack sample. While the POHC gas is being passed into the glass manifold, a major portion of the gas is drawn through a VOST according to the method specifications and procedures. The collected POHC are analyzed by thermal desorption, purge and trap, and gas chromatography/mass spectrometry (GC/MS) or an equivalent method approved by the EPA.

3.0 APPARATUS

3.1 GLASS MANIFOLD

A glass manifold is supplied. One side of the glass manifold is connected with Teflon® tubing to the audit cylinder. The other end of the glass manifold should be connected with Teflon® tubing to a rotameter and the excess gas from the rotameter should be vented into a hood. The glass manifold is heated to 100°C with heating tape. The heating tape, rotameter, 1/4-inch male/female glass joints, and Teflon® tubing are also supplied. One port of the glass manifold should be connected to the VOST probe with 1/4-inch male/female glass joints. A schematic diagram of the glass manifold is shown in Figure 1.

3.2 VOST COMPONENTS

The sampling train component parts, except for the glass manifold, are the same as those used for VOST.

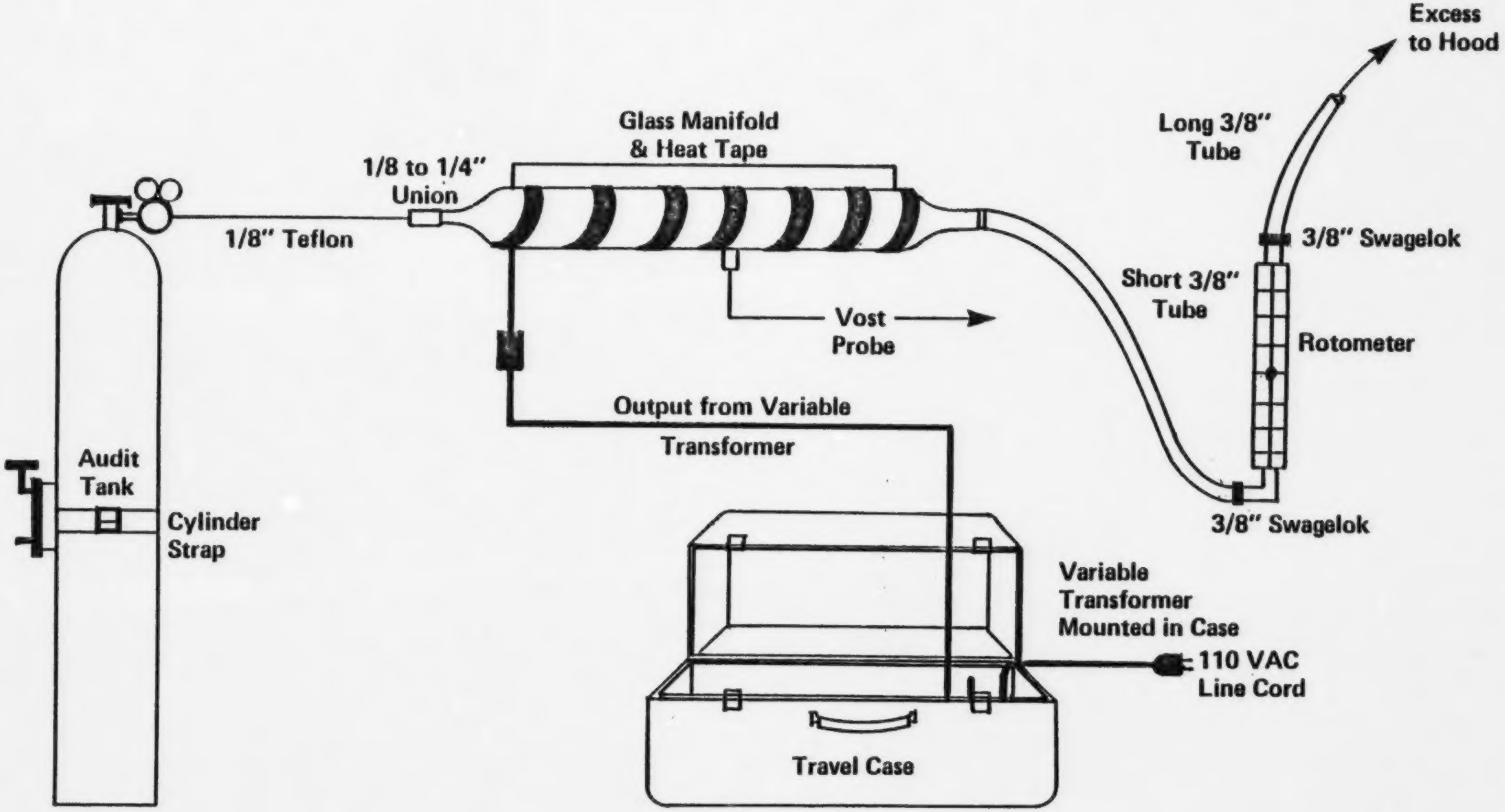
Excess
to Hood
Glass Manifold
& Heat Tape
Long 3/8"
Tube
1/8 to 1/4"
Union
1/8" Teflon
3/8" Swagelok
Short 3/8"
Tube
Vost
Probe
Rotometer
Output from Variable
Transformer
Audit
Tank
Cylinder
Strap
3/8" Swagelok
Variable
Transformer
Mounted in Case
110 VAC
Line Cord
Travel Case

Figure 1. Schematic Diagram of Audit Material Delivery System

3.3 ANALYSIS

Refer to the method specifications and procedures for the VOST method.

4.0 AUDIT MATERIAL (GAS CYLINDERS)

The audit material is supplied in gas cylinders. A maximum of 50 L of gas is to be used for each test run. A two-stage gas regulator is supplied for use with the gas cylinder.

5.0 PROCEDURES

5.1 SAMPLING

5.1.1 Preparation of VOST

All train components should be cleaned and assembled as described in the VOST method used.

5.1.2 Leak-Check Procedure

Before the sampling run, the train is leak-checked as described in the VOST method. During sampling, all connections should be visually examined.

5.1.3 Sample Generation

The gas sample from the audit cylinder is passed through the glass manifold at a flow rate of 2 L/min for 3 minutes to condition the glass system. A glass rotameter is supplied to measure the flow rate at the end of the glass manifold. The VOST probe then should be connected to one port of the glass manifold with 1/4 inch male/female joints and the probe should be purged with audit gas for an additional 2 minutes so that the probe is purged of ambient air before initiation of sample collection. This can be accomplished either by attaching a pump to a three-way stop-cock above the first condenser and drawing audit gas through the probe via the three-way stop-cock or by any other suitable method.

5.2 SAMPLE COLLECTION

After leak-checking and conditioning the glass probe, sample collection is accomplished by opening the valve at the inlet to the first condenser, turning on the pump and sampling at a rate of 0.5 L/min for 20 minutes. The sampling rate is measured with the rotameter which is part of the VOST. The volume of sample for any pair of the traps should not exceed 10 L. The temperature of the gas stream at the inlet to the first sorbent cartridge must be maintained at 20°C during sample collection.

After the collection of 10 L of sample, the train is leak-tested using the procedures described in the method used. If leak-test criteria as described in the method are not met, the samples should not be analyzed. If leak-test criteria are met, the train is returned to atmospheric pressure, the two sorbent cartridges are removed, the end caps are replaced, and analysis of cartridges is performed.

Repeat the sample collection procedure two more times with two new pairs of sample cartridges in the VOST, collect 10 L of sample each time, and perform the analysis.

5.3 SAMPLE ANALYSIS

Follow the procedures described in the method for sample analysis, calibration, and calculations. Report the amount of each constituent in the three samples and the blank values to the Project Officer and the audit supervisor for evaluation.

INSTUCTIONS FOR USE OF VOST AUDIT KIT

1. Attach the supplied tubing to the manifold according to the diagram shown in Figure 1. (See page 66.)

2. The manifold and rotometer should be secured to the support stand with the clamps provided in the kit. Most situations will require the manifold to be mounted vertically with the inlet at the bottom, and parallel to the rotometer. Allow the short 3/8" O.D. tubing to loop around to the bottom of the rotometer, without introducing any sharp kinks which may restrict the gas flow.

3. Gently pull the electrical cords from their compartment and connect according to the diagram on the reverse. The nominal length for the 110 VAC power cord is 8 feet and the nominal length for the output cord is 6 feet.

4. Temporarily remove the short 3/8" tubing from the outlet end of the manifold and insert the dial thermometer into the manifold. Adjust the variable transformer, which is mounted in the case, to heat the manifold to approximately 100°C. A setting of 50 on the scale should be sufficient to attain 100°C. After the manifold temperature has become stable, remove the thermometer and reattach the 3/8" tubing.

5. Adjust the regulator to start gas flow. The rotometer is downstream of the manifold and should be used to regulate the excess gas flow from the manifold. Approximate flow rates at COB are given below:

Gas Flow	Center of Ball
1.0 STD L/min	12.7
1.3	15.0
1.9	20.0
2.5	24.7
3.0	28.7
3.2	30.0
3.5	32.7

   The rotometer will present negligible back pressure to the manifold. ΔP for 5 L/min is 1 inch of water column.

6. After sampling is completed, allow the manifold to cool, disassemble and repackage the kit in the case. Gently push the power and output cords back into their compartment. Remove the knob from the regulator to facilitate packing in its' compartment.

APPENDIX C
PERMEATION TUBE RATE DATA

A. PERMEATION RATE DATA FOR METHYL ETHYL KETONE
B. PERMEATION RATE DATA FOR ACETONITRILE
C. PERMEATION RATE DATA FOR TRICHLOROETHYLENE
D. PERMEATION RATE DATA FOR 1,2-DICHLOROETHANE
E. PERMEATION RATE DATA FOR VINYL CHLORIDE
F. PERMEATION RATE DATA FOR BROMOMETHANE
G. PERMEATION RATE DATA FOR BENZENE
H. PERMEATION RATE DATA FOR CARBON TETRACHLORIDE
I. PERMEATION RATE DATA FOR 1,2-DIBROMOETHANE
J. PERMEATION RATE DATA FOR FREON 12 (WAFER-TYPE PERMEATION DEVICE)
K. PERMEATION RATE DATA FOR FREON 11
L. PERMEATION RATE DATA FOR CHLOROFORM
M. PERMEATION RATE DATA FOR 1,1,1-TRICHLOROETHANE
N. PERMEATION RATE DATA FOR PERCHLOROETHYLENE

A. PERMEATION RATE DATA FOR METHYL ETHYL KETONE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, nq/min. Calc.	Rate, nq/min. Avg. of Last 3 ± Std. Dev.
3/21/84	1006	9.407179	0	---	----
4/06/84	1310	9.401605	23224	240	----
4/12/84	1644	9.399607	8854	226	----
5/15/84	1608	9.388331	47484	237	234 ± 7.7
5/25/84	1347	9.384971	14259	236	233 ± 6.4
7/03/84	1320	9.372270	56133	226	233 ± 6.0
8/14/84	1522	9.358500	60602	227	230 ± 5.2
10/04/84	1117	9.342162	73195	223	226 ± 2.1
11/11/84	1725	9.329975	55088	221	224 ± 3.1
12/28/84	1728	9.315429	67683	215	220 ± 4.3
2/22/85	1140	9.298565	80292	210	215 ± 4.6
4/11/85	1430	9.283756	69290	214	213 ± 2.1
6/24/85	1615	9.261100	64844	216	215 ± 4.0

B. PERMEATION RATE DATA FOR ACETONITRILE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
3/21/84	1003	7.202254	0	---	----
4/06/84	1313	7.198543	23230	160	----
4/12/84	1647	7.197136	8854	159	----
5/15/84	1553	7.189600	47466	159	159 ± 0.5
5/25/84	1327	7.187370	14254	156	158 ± 1.4
8/14/84	1535	7.169260	116768	155	157 ± 1.9
10/04/84	1121	7.157775	73186	157	156 ± 1.0
11/11/84	1728	7.149302	55087	154	155 ± 1.6
12/28/84	1716	7.139032	67668	152	154 ± 2.6
2/22/85	1135	7.127004	80299	150	152 ± 1.6
4/11/85	1402	7.116492	69267	152	151 ± 0.9
5/10/85	1540	7.110357	41858	147	149 ± 2.1
6/24/85	1620	7.100157	64840	157	155 ± 4.4

C. PERMEATION RATE DATA FOR TRICHLOROETHYLENE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
3/21/84	1003	7.615336	0	---	----
4/06/84	1313	7.605070	23230	442	----
4/12/84	1647	7.601586	8854	393	----
5/15/84	1553	7.580562	47466	443	426 ± 28.3
7/03/84	1327	7.550092	70414	433	423 ± 26.1
8/14/84	1535	7.523522	60608	438	438 ± 5.1
10/04/84	1121	7.491442	73186	438	436 ± 3.3
11/11/84	1714	7.467495	55073	435	437 ± 2.0
12/28/84	1725	7.437981	67691	436	436 ± 1.8
2/22/85	1119	7.403042	80274	435	435 ± 0.5
4/15/85	1347	7.370239	75028	437	436 ± 0.8
5/10/85	1555	7.354876	36128	425	433 ± 5.2
6/24/85	1607	7.326343	64812	440	439 ± 6.5

D. PERMEATION RATE DATA FOR 1,2-DICHLOROETHANE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
3/21/84	1009	10.071488	0	---	----
4/06/84	1308	10.063885	23219	327	----
4/12/84	1542	10.061005	8794	327	----
5/15/84	1551	10.045316	47529	330	328 ± 1.5
7/03/84	1319	10.022900	70408	318	325 ± 6.2
8/14/84	1520	10.003421	60601	321	323 ± 6.1
10/04/84	1135	9.979827	73215	322	321 ± 2.0
11/11/84	1702	9.962440	55047	316	320 ± 3.5
12/28/84	1704	9.940788	67682	320	319 ± 3.2
2/22/85	1132	9.915571	80308	314	317 ± 2.5
4/11/85	1454	9.893581	69322	317	317 ± 2.4
5/10/85	1529	9.880462	41795	314	315 ± 1.5
6/24/85	1537	9.859942	64808	317	317 ± 1.4

E. PERMEATION RATE DATA FOR VINYL CHLORIDE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
4/13/84	1655	5.358506	0	---	----
4/26/84	0916	5.347064	18261	627	----
5/15/84	1601	5.329644	27765	627	----
7/03/84	1323	5.284878	70402	636	630 ± 5.1
8/14/84	1527	5.246041	60604	641	635 ± 6.8
9/03/84	1232	5.227665	28625	642	640 ± 3.2
9/16/84	1636	5.215302	18964	652	645 ± 6.1
10/04/84	1115	5.199146	25599	631	642 ± 10.4
11/11/84	1707	5.164174	55072	635	639 ± 11.1
12/28/84	1707	5.121084	67680	637	634 ± 2.9
2/5/85	1636	5.085825	56129	628	633 ± 3.7

F. PERMEATION RATE DATA FOR BROMOMETHANE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min. Calc.	Rate, ng/min. Avg. of Last 3 ± Std. Dev.
3/21/84	0955	3.076118	0	---	----
4/06/84	1304	3.068410	23229	332	----
4/06/84	1645	3.068510	221	---	----
4/12/84	1534	3.065752	8569	322	----
5/15/84	1558	3.050005	47544	331	----
7/03/84	1328	3.026679	70410	331	328 ± 5.4
8/14/84	1530	3.006344	60602	336	333 ± 2.5
10/04/84	1112	2.981920	73182	334	334 ± 2.1
11/11/84	1712	2.963744	55080	330	333 ± 2.8
12/28/84	1722	2.941288	67690	332	332 ± 1.9
2/22/85	1128	2.914634	80286	332	331 ± 0.9
4/11/85	1433	2.891602	69305	332	332 ± 0.2
5/10/85	1534	2.877934	41821	327	330 ± 2.5
6/24/85	1552	2.856373	64818	333	332 ± 2.7

G. PERMEATION RATE DATA FOR BENZENE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
9/26/83	1053	10.112975	-----	---	----
10/04/83	1120	10.108570	11547	381	----
10/19/83	1630	10.099715	21910	404	----
11/11/83	1410	10.086777	32980	392	393 ± 11.3
11/28/83	1245	10.077150	24395	395	397 ± 6.3
12/08/83	1605	10.071084	14600	415	401 ± 12.8
12/12/83	1322	10.069308	5597	317	376 ± 51.7
1/11/84	1553	10.052030	43351	399	377 ± 52.5
1/25/84	0958	10.044355	19805	388	368 ± 44.1
2/22/84	0948	10.028590	40310	391	392 ± 5.6
3/21/84	1052	10.012661	40384	394	391 ± 3.5
4/12/84	0920	10.000166	31588	396	394 ± 2.3
5/15/84	1645	9.981283	47965	394	395 ± 0.9
7/03/84	1348	9.953691	70383	392	394 ± 1.8
8/14/84	1512	9.929800	60564	394	393 ± 1.2
9/03/84	1227	9.918611	28635	391	392 ± 1.9
10/04/84	1255	9.901032	44668	394	393 ± 1.9
11/11/84	1653	9.879547	54958	391	392 ± 1.6
12/28/84	1701	9.853070	67688	391	392 ± 1.4
2/05/85	1646	9.831206	56145	389	391 ± 0.8
4/11/85	1339	9.794760	93413	390	390 ± 0.7
5/10/85	1520	9.778600	41861	386	389 ± 1.8
6/24/85	1459	9.753051	64779	394	390 ± 3.4

H. PERMEATION RATE DATA FOR CARBON TETRACHLORIDE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
9/08/83	1028	11.782350	-----	---	----
9/15/83	0905	11.779715	9997	264	----
9/23/83	0918	11.776830	11533	250	----
10/03/83	1655	11.772735	14857	276	263 ± 12.7
10/19/83	1630	11.766260	23015	281	269 ± 16.6
12/12/83	1315	11.745652	77565	266	274 ± 7.9
1/11/84	1517	11.733950	43322	270	272 ± 8.1
2/22/84	0935	11.717890	60138	267	268 ± 2.3
4/12/84	1616	11.698815	72401	263	267 ± 3.3
5/15/84	1643	11.685944	47547	271	267 ± 3.6
7/03/84	1344	11.667252	70381	266	267 ± 3.7
8/14/84	1501	11.651021	60557	268	268 ± 2.6
9/03/84	1221	11.643461	28640	264	266 ± 2.0
10/04/84	1236	11.631450	44655	269	267 ± 2.7
11/11/84	1649	11.616827	54973	266	266 ± 2.5
12/28/84	1653	11.598952	67684	264	266 ± 2.5
2/05/85	1633	11.584444	56140	258	263 ± 3.2
4/11/85	1549	11.559467	93556	267	263 ± 3.6
5/10/85	1528	11.548491	41739	263	263 ± 3.5
6/24/85	1456	11.531157	64768	268	266 ± 2.1

I. PERMEATION RATE DATA FOR 1,2-DIBROMOETHANE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min. Calc.	Rate, ng/min. Avg. of Last 3 ± Std. Dev.
11/11/84	1643	26.254100	0	---	----
12/02/84	1505	26.238300	30142	524	----
12/28/84	1643	26.213700	37538	655	----
2/22/85	1112	26.167800	80309	572	584 ± 54.2
4/11/85	1350	26.128200	69278	572	599 ± 39.5
5/10/85	1446	26.103700	41816	586	476 ± 6.8
6/24/85	1431	26.066500	64785	574	573 ± 6.2

J. PERMEATION RATE DATA FOR FREON 12 (WAFER-TYPE PERMEATION DEVICE)

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min. Calc.	Rate, ng/min. Avg. of Last 3 ± Std. Dev.
8/16/84	1445	20.584800	0	---	----
8/22/84	1608	20.579600	8723	596	----
9/03/84	1240	20.570400	17072	539	----
10/04/84	1126	20.546700	44566	532	556 ± 35.3
11/11/84	1658	20.515700	55052	563	545 ± 16.4
12/28/84	1711	20.478200	67693	554	550 ± 16.1
2/22/85	1116	20.434200	80285	548	555 ± 6.2
4/11/85	0411	20.395600	68695	562	555 ± 5.7
5/10/85	1557	20.374100	42466	506	539 ± 23.6
6/24/85	1422	20.338700	64705	547	555 ± 23.5

K. PERMEATION RATE DATA FOR FREON 11

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min. Calc.	Rate, ng/min. Avg. of Last 3 ± Std. Dev.
8/14/84	1456	4.258547	0	---	----
8/22/84	1601	4.252418	11585	529	----
10/04/84	1130	4.220167	61649	523	----
11/11/84	1709	4.191590	55059	519	524 ± 5.0
12/28/84	1719	4.156605	67690	517	520 ± 3.2
2/22/85	1124	4.115066	80285	517	518 ± 0.9
4/11/85	1552	4.079076	69388	519	518 ± 0.8
5/10/85	1555	4.057745	41763	511	516 ± 3.5
6/24/85	1545	4.024100	64790	519	519 ± 3.9

L. PERMEATION RATE DATA FOR CHLOROFORM

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
9/08/83	1028	12.144390	-----	---	----
9/15/83	0900	12.142700	9992	169	----
9/23/83	0915	12.140650	11535	178	----
10/03/83	1654	12.137910	14859	184	177 ± 7.7
10/19/83	1630	12.133370	23016	197	186 ± 9.9
12/12/83	1340	12.119373	77590	180	187 ± 8.8
1/11/84	1525	12.111021	43305	193	190 ± 8.7
2/22/84	0939	12.100180	60134	180	185 ± 7.2
3/21/84	0939	12.092851	40320	182	185 ± 6.9
4/12/84	1614	12.086928	32075	185	182 ± 2.2
5/15/84	1638	12.078136	47544	185	184 ± 1.7
7/03/84	1345	12.065269	70387	183	184 ± 1.2
8/14/84	1504	12.054074	60559	185	184 ± 1.2
9/03/84	1216	12.048717	28632	187	185 ± 2.1
10/04/84	1239	12.040517	44663	184	185 ± 1.8
11/11/84	1647	12.030424	54968	184	185 ± 2.0
12/28/84	1650	12.018009	67683	183	184 ± 0.1
2/05/85	1635	12.007974	56145	179	182 ± 2.3
4/11/85	1547	11.990758	93552	184	182 ± 2.4
5/10/85	1523	11.983266	41736	180	181 ± 2.3
6/24/85	1524	11.971421	64801	183	182 ± 1.9

M. PERMEATION RATE DATA FOR 1,1,1-TRICHLOROETHANE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min. Calc.	Rate, ng/min. Avg. of Last 3 ± Std. Dev.
11/11/84	1638	21.256900	0	---	----
12/02/84	1502	21.249200	30144	255	----
12/28/84	1640	21.238300	37538	290	----
2/22/85	1109	21.219100	80309	239	262 ± 21.4
4/11/85	1348	21.202300	69279	242	257 ± 23.4
5/10/85	1515	21.190000	41847	294	259 ± 25.1
6/24/85	1429	21.173900	64754	249	246 ± 22.9

N. PERMEATION RATE DATA FOR PERCHLOROETHYLENE

Date	Military Time	Mass in Grams	Time Interval (min.)	Rate, ng/min.	
				Calc.	Avg. of Last 3 ± Std. Dev.
8/30/83	1544	7.175680	---	---	----
9/08/83	1621	7.169790	12997	453	----
9/15/83	0840	7.165320	9619	465	----
9/26/83	1032	7.158045	15952	456	458 ± 6.0
10/03/83	1650	7.153450	10458	439	453 ± 12.9
10/05/83	1336	7.152400	2686	391	429 ± 33.8
12/12/83	1345	7.108874	97929	444	425 ± 29.6
1/11/84	1521	7.089595	43296	445	427 ± 31.2
2/27/84	1617	7.059930	67736	438	443 ± 4.0
3/21/84	1032	7.045630	32775	436	440 ± 4.8
4/12/84	1625	7.031466	32033	442	439 ± 3.0
5/15/84	1648	7.010514	47543	441	440 ± 3.0
7/03/84	1349	6.979667	70381	438	440 ± 2.0
8/14/84	1517	6.952837	60568	443	441 ± 2.3
9/03/84	1212	6.940168	28615	443	441 ± 2.6
10/04/84	1250	6.920525	44678	440	442 ± 1.9
11/11/84	1704	6.896424	54974	438	440 ± 2.2
12/28/84	1714	6.866720	67690	439	439 ± 0.6
2/05/85	1642	6.842695	56128	428	435 ± 5.0
4/11/85	1553	6.801284	93551	443	437 ± 6.2
5/10/85	1542	6.783276	41749	431	434 ± 6.3
6/24/85	1527	6.754380	64785	446	440 ± 6.3